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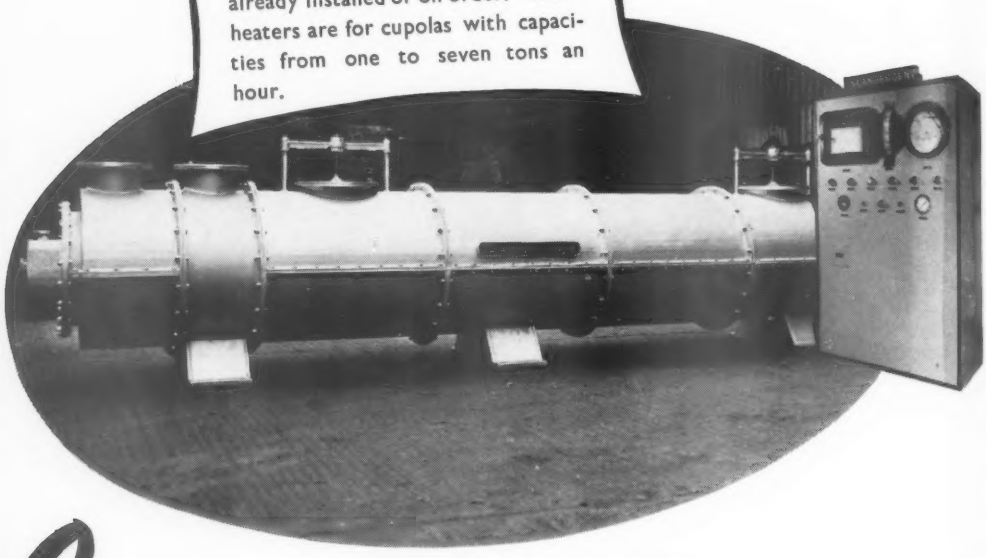

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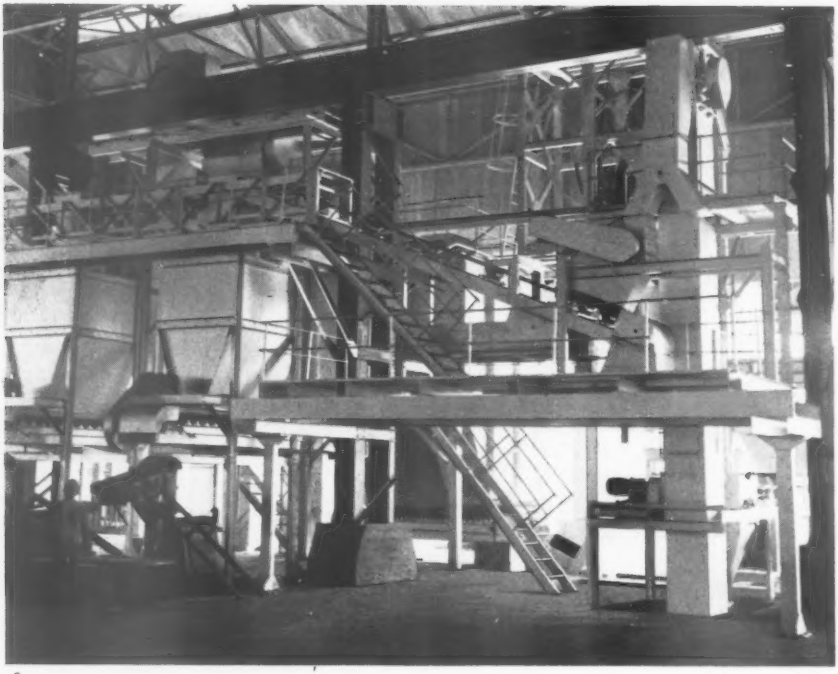

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Photograph shows plant for conveying return sand into the bucket of a loader prior to charging an August-Simpson Mix-Muller. The mixed sand is then elevated, aerated, conveyed and distributed to large moulders' supply hoppers fitted with belt feeders. A cooling tower, also incorporated in this plant, ensures the efficient cooling of the return sand.

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Vol. 106 MARCH 12, 1959 No. 2213

Ironfoundry Research

The Department of Scientific and Industrial Research has published an interesting, if somewhat complicated, Report, " Estimates of Resources Devoted to Scientific and Engineering Research and Development in British Manufacturing Industry, 1955 "*. It discloses some new and interesting figures such as, for instance, that in the year under consideration, a sum of £300 million was spent by industry on research and of that, £62 million was spent by private industry, but about two-thirds of this was on Government account. Unfortunately, neither non-ferrous founding nor the steelfoundry industry is dealt with separately, the former is included under the heading " Non-ferrous metals, smelting, rolling, etc.," or perhaps under " Brass manufactures," whilst the latter appears under the general heading, " Other iron and smelting, rolling, etc." Even the iron foundry in the earlier section of the Report is covered by " metal manufacture."

It is not until Table 8 is reached that specific information is given about ironfounding. Here, it is shown that this section of the industry spent £788,000 on research, of which private industry contributed £590,000 and the research association—presumably the British Cast Iron Research Association—£198,000, or 25 per cent. of the total. The ironfounders privately employed 454 persons to carry out their research activities. Another table gives private expenditure on ironfoundry research as £6.1 per person employed; 0.4 per cent. of the turnover and 0.8 per cent. of net outputs. The last figure must be a cardinal one as it is used in Table 12 which gives a classification of industries according to the magnitude of this figure. It is headed by " Aircraft " with over 10 per cent. and iron foundries appear a long way down, but are in the same bracket as iron and steel. Table 13 is quite interesting; of the 454 persons employed by private iron foundries, there were 77 scientists of whom 59 were whole time and 45 qualified engineers (25 full time). These were supplemented by 567 other people (370 full time). The total is arrived at by converting the part-timers to equivalent full-time personnel.

We are well aware that statistics do not always clearly reveal the actual position, yet this 59 full-time scientists shows up rather badly compared with most other industries. It is necessary to point out, of course, that the scientists and engineers taken into consideration in the listing are university graduates or members of certain named technical institutes, membership of which is by examination. Perhaps the ironfoundry listing suffers from the fact that there is no qualifying body for our industry.

Obtainable from Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2 ; price 3s. net.

Export of Iron and Steel Scrap

Steelmakers have been perturbed by the loss to the industry of good-quality scrap as a result of free exports, but realizing that it was hardly the responsibility of scrap merchants to stockpile, they have made an assessment of the present and future position as follows.

It has been estimated that from September last year to March 7, 1959, when the export licensing arrangements expired, some 400,000 to 500,000 tons of steel and iron scrap, mainly the heavy grades, will have been exported from the UK. Furthermore, there is evidence that, in general, home scrap is arising less freely—particularly the better qualities. It is felt that if arrangements can be made by the steel industry to stock shipbreaking scrap, and if steelmakers will maintain their stocks at least at the present level, a major proportion of any surplus scrap arising may be absorbed and a complicated scheme on a national scale for stocking scrap can be avoided.

With this in view, steelmakers will not further reduce their stocks of scrap and the British Iron and Steel Federation has put in hand arrangements whereby shipbreaking scrap will be stock-piled at an annual rate of 250,000 tons. The steel industry is therefore in a position to assure scrap merchants that scrap stocks will not be reduced below the level held at January 24, and as far as possible scrap purchases by steel makers will be commensurate with the rate of consumption. Companies which have reduced their scrap stocks to a low level will endeavour to raise these to a more normal level. It is possible that in some areas merchants may temporarily be unable to deliver scrap at the rate required and some fluctuations in the stocks at individual works may be unavoidable. It is anticipated, however, that now the export of heavy scrap has ceased, the position will be such that steelmakers will not experience difficulty in obtaining deliveries at least at a rate commensurate with their rate of consumption.

British Piston Ring's Jubilee

The British Piston Ring Company, Limited, of Coventry, commemorated on March 9, the 50th anniversary of the founding of the company, with a dinner given to their long-service employees, at the Leofric Hotel, Coventry. The chairman and managing director, Mr. V. W. Oubridge, M.I.MECH.E., M.I.P.E., presided over a gathering of more than 150 employees, past and present, who had each served over 25 years with the company—a qualification which also merits the presentation of a gold watch.

The founder of the company, and father of the present chairman, was the late Mr. William A. Oubridge, who in the early years of motoring history, foresaw the need for precision-made piston rings, and devised the means of producing them. Through the years the firm has constantly expanded to meet the ever-growing technical and production requirements of the motor industry and piston rings are now only a part of their manufacturing range. Modern, high-production foundries and machine-shops at Coventry and Warwick, produce a variety of specialized engine components, and to-day, the majority of vehicles on the road owe their mobility in some part to the company's products.

CRITTALL MANUFACTURING COMPANY, LIMITED—Mr. R. G. B. Crittall has been appointed a director. Mr. C. E. Rogers has resigned from the board.

Forthcoming Events

MARCH 14

Institute of British Foundrymen

Newcastle and district branch: Visit to William Doxford & Sons (Engineers), Limited, Pallion, Sunderland.

MARCH 16

Institution of Production Engineers

East and West Ridings region: Works visit to David Brown Industries, Limited, Park Gear Works, Huddersfield. Rendezvous the Odeon Cinema, Halifax, 6.15 p.m.; arrival at works entrance 7 p.m.

MARCH 17

Institute of British Foundrymen

Slough section: "Mechanical Aids to Shell Moulding," by D. H. Scott, 7.30 p.m., at High Duty Alloys, Limited.

MARCH 18

Institute of British Foundrymen

Southampton section: "Cupola Experiments," by K. G. Harris, B.SC., 7.30 p.m., at the Technical College, St. Mary's Street.

Institute of Vitreous Enamellers

Southern section: "Annual general meeting followed by "Influence of Chemical Composition of Enamel on its Alkaline Resistance," by A. N. Revell, 7.15 p.m., at the Howard Hotel, Norfolk Street, London, W.C.2.

Institution of Production Engineers

Dundee section: "Job Evaluation and Wage Structure," by A. S. Wilson, 7.30 p.m., at the North British Hotel, Princes Street, Edinburgh.

Society of Chemical Industry

Corrosion group: "Economic Aspects of Corrosion," by A. Keynes, 6.30 p.m., at 14, Belgrave Square, London, S.W.1.

MARCH 19

Institute of British Foundrymen

Northampton and district section: Two short papers to be presented by J. W. Deaton and R. Jelley, 7.30 p.m., in the Georgian Room, Hind Hotel, Wellingborough.

Institution of Production Engineers

London section: "Diploma of Technology and the Place of Human Studies in its Syllabus," by A. C. Leyton, B.A., 7 p.m., at the Royal Empire Society, Northumberland Avenue, W.C.2.

Institute of Vitreous Enamellers

Northern section: "Sheet Steel for Enamelling," by Dr. W. H. F. Tickle, at the Old Nag's Head Hotel, Manchester.

MARCH 20

Institute of British Foundrymen

West Wales section: "Foundry Costing," by W. E. Harrison, 7 p.m., at Llanelly.

Manchester Association of Engineers

Annual general meeting followed by "Production Investigations applied in Practice," by N. Dudley and F. Koenigsberger, 6.45 p.m., at the Engineers' Club, Albert Square, Manchester.

MARCH 21

Institute of British Foundrymen

Stoke-on-Trent section: Works visit to Ferodo, Limited, Chapel-en-le-Frith, Stockport.

Wales & Monmouth branch: "Surface-finish for Non-ferrous Castings"—Report of sub-committee T.S.48—by D. V. Atterton, 6 p.m., at the Engineers' Institute, Cardiff.

Dinner

The annual dinner of Aga Heat, Limited (held in connection with the conference of the firm's agents), took place last week at the Dorchester Hotel, Park Lane, London, W.1. Mr. Vincent Jobson, chairman of the company, presided and with him at the high table were Mr. Noel Gee, M.C., Mr. E. O. Ransome, Mr. H. C. Wilson Bennetts, Mr. Charles Insch, Mr. E. F. G. Slough, Mr. J. Stanleigh Turner, J.P., Mr. H. Cunliffe, Mr. H. V. Shelton, Mr. J. S. Williams, O.B.E., Mr. K. C. Bowyer, Mr. A. H. Masser, Mr. R. G. Leach, C.B.E., Mr. Lionel Locket; Mr. A. D. Brown, Mr. R. A. Smith, Mr. G. E. Richards, Mr. G. R. Webster, Mr. A. K. Craighead, Mr. L. J. Sinden, Mr. F. Moffat and Mr. John Darby. Following the speeches a cabaret was provided by Margot Henderson and Vendryes.

*Craft Apprentices' Corner**

Feeding Heads . . .

. . . with "Tubal Cain" on the Job!

Y'know fellers, of all the defects that can occur in castings, one group is most persistent and annoying, and yet it is a group about which the practical man seems to be troubled least. The defects I'm thinking about are those due to the solidification shrinkage of the metal, and even though, fundamentally, it is part of the practical man's job to avoid the occurrence of such defects, of late he seems to have been dodging the issue and getting away with it very nicely by blaming the metal. In these days of technical control, much of the responsibility of deciding what feeding system is satisfactory for what job has been taken away from the practical man, and put into the hands of the technician. Unfortunately, some of these "technical bods" are pretty jealous of their new responsibilities, and not always disposed to divulge their superior knowledge of metallurgical matters to the ordinary, everyday, common-or-garden moulder. The result is that technical men remain pretty secretive about the why's and wherefore's, and rather tend simply to instruct a moulder on what feeding system to adopt without giving him the reasons for it. Because most technicians are of the younger generation, the older practical men are often quite willing to sit back and watch the "know-alls" make fools of themselves. Now I'm not concerned about the ethics of the thing, but it has occurred to me that if the younger generation of practical men are having to learn their trade under such conditions then they're not going to get much opportunity to get to know about the behaviour of metals during solidification—ultimately of course, to their own disadvantage. If that's going to be the case, then something should be done about it, and these little talks of ours are as good a place as any to do it.

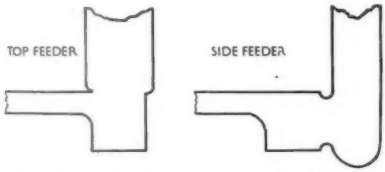


FIG. 1.—*Convenient methods of placing feeder heads.*

Shrinkage is a nuisance!

Just in case you don't already know, when a metal solidifies it shrinks in volume, and the total volume reduction takes place in three stages. The first reduction in volume is taking place all the time that the metal is molten, *i.e.*, until it just begins to solidify—this stage we know as "liquid shrinkage," and it is of little importance as far as the practical man is concerned. The second reduction in volume takes place during the actual period of solidification of the metal—this stage is known as "solidification shrinkage," and is the one which has the most profound influence upon the soundness or otherwise of the casting. The last reduction in volume takes place after the metal has completely solidified and is cooling down to room temperature—this stage is known as "solid contraction," and is taken care of by the pattern-maker's allowance.

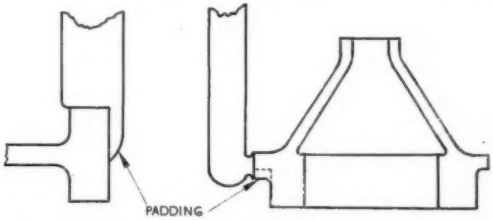


FIG. 2.—*Castings are often thickened in the area of the feeder to allow a larger feeder-neck to be used.*

All of the metals and alloys used for casting purposes experience shrinkage in some degree, and unless appropriate steps are taken this will give rise to shrinkage cavities in the castings. Such cavities are sometimes found on the surface of the casting in the form of a "draw," "sink," or "soak," but more often they occur in the actual wall thickness of the casting. In the latter case the defect may be quite pronounced and severe in the form of a hole

* Popular jargon of the foundry floor has been used in parts of this article. Apologies are made to translators—Editor.

Craft Apprentices' Corner

(" shrinkage cavity ") or it may be less pronounced and severe and exist around the grain boundaries of the metal (" porosity " or " micro-porosity "). These internal cavities are particularly annoying, because what appears on the face of it to be a clean, sound casting will certainly leak under pressure the amount of leakage depending upon the pressure

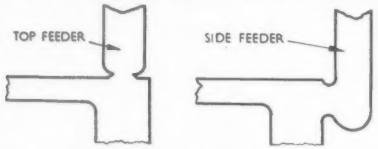


FIG. 3.—*Grey-iron feeders must be of a reasonably small size, because they are broken off, not cut off.*

applied and the severity of the defect. It is also worth remembering that shrinkage defects are most likely to occur in those castings which have rapid changes in section thickness. So much for the defect and its cause—what of the cure?

What can be done about it?

Several factors can influence the formation of shrinkage defects, *e.g.*, the mould material, rate of pour, pouring temperature, metal analysis, casting design, etc. However, as the basic cause is the solidification shrinkage of the metal, it is obvious that the basic cure lies in providing sufficient liquid feed metal to compensate for that which is lost in shrinkage. This is, of course, the method universally adopted. Unfortunately it is impossible to lay down any hard and fast rules regarding the shape, size, and position of the feeding heads required. It is wiser to stick to basic principles and " learn as you go."

Put feeders on the heavy sections . . .

We known from past experience that shrinkage defects are most likely to be found in the heavy sections of a casting, hence commonsense dictates that the feeders should be placed at or on the heavy sections—in this way they will obviously do the most good. " At or on " means *at* the heavy section as a side feeder, or *on* the heavy section as a top feeder (see Fig. 1). Convenience nearly always dictates the use of a top or side feeder, convenience, that is, from the point of view of efficiency in feeding, ease in moulding, and ease of removal by fettling operations. The shape of the feeder is largely a matter of individual choice; round, square, rectangular, octagonal, kidney, all are used. Size for size, however, a round-section feeder is probably most efficient of all, as it has less surface area and therefore less heat-radiation loss.

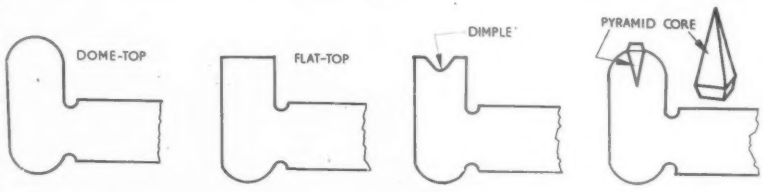
. . . and have an adequate feeder neck.

The connecting neck of a feeder is important, since it must be large enough to remain molten, or at least pasty, until the casting itself has solidified—only in this way can one be sure that the liquid metal in the feeder will pass into the casting. Depending upon the design of any particular casting, it is not always possible to have the feeder neck as large in cross-sectional area as one would like it—in such cases it is by no means unusual to " thicken " or " pad " the casting in the area of the feeder to allow of a larger feeder-neck being used (see Fig. 2). Such a pad is, of course, surplus to the casting, and will later have to be removed either by cutting, grinding, or by a machining operation, whichever may be convenient.

Feeder height is important . . .

The height of a feeder, too, is important—in the case of the heavy alloys, the higher the feeder is above the casting the greater is the pressure forcing the liquid metal through the neck. In the light alloys, however, this is not so because, being so light in relation to volume, a high feeder on aluminium and magnesium alloys makes little or no difference to its effectiveness. Hence the light-alloy founder favours a short squat feeder, but one which has ample cross-sectional area. In passing, it might be appropriate to remark that to the out-and-out grey-iron founder, who has little trouble with feeding his castings, all of the foregoing is often difficult to assimilate. This can easily be appreciated when we remember that feeders on grey-iron castings are *broken* off, but those on steel and non-ferrous alloys are *cut* off. Hence the grey-iron founder is always conscious of the fact that he must keep his feeders down to a reasonable size in order to avoid " breaking-in " (see Fig. 3).

FIG. 4.—*Various types of blind feeders. The dimple, and pyramid core, are designed to allow atmospheric pressure to reach the centre of the feeder.*



. . . whether they're open or " blind ". . .

It is a matter of individual choice whether the top of a feeder will be open to the atmosphere (*i.e.*, projecting right through the cope) or whether it will be " blind " (*i.e., not* projecting right through the cope). Some founders hold that an open feeder has the advantage of extra length, while others feel that the pressure set up in the top of a blind feeder is more useful than the extra length, and the shorter feeder also, of course, saves a few pounds of metal.

Blind feeders may be flat-topped or dome-topped according to choice. Further refinements are often incorporated in a blind feeder. One is the provision of a centre dimple, and the other the inclusion of a pyramid core. Both of these function in exactly

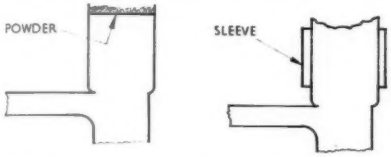


FIG. 5.—*Two methods of using exothermic compounds.*

the same way, and the reason for their use is to allow atmospheric pressure to penetrate to the centre of the feeder. A hot-spot is formed at the apex of the dimple or pyramid, causing a very fine contraction crack to develop. Atmospheric pressure can then permeate through the sand of the mould, and down through the crack, thus bringing pressure to bear on the pasty metal in the centre of the feeder, and increasing the efficiency of the feeder (see Fig. 4).

. . . and exothermic compounds are useful.

Some founders make use of exothermic compounds (feeding fluxes) in an effort to increase the efficiency of the feeders. These compounds, when in powder form, are sprinkled on top of the feeder immediately after pouring, and, because the compound gives out heat by means of a Thermit reaction the metal in the feeder is kept molten, or at least mushy, for an extended period. Again, according to choice, the exothermic compound may be pre-formed into a sleeve positioned around the feeder pattern during ramming-up. When the feeder pattern is withdrawn the exothermic sleeve forms the side walls of the feeder (Fig. 5).

section (thick and thin sections adjoining), the chills or denseners are positioned at the heavy section, so that the heavy section and light section solidify at the same rate (see Fig. 6).

. . . and, if possible, place feeders near ingates.

When molten metal flows around the mould cavity it gives up heat to the mould material, and, according to conditions (mould material, surface area of the mould traversed by the metal, rate of pour, etc.) the drop in temperature between starting and finishing the pouring operation can vary widely. However, at the instant the mould cavity is completely full, the hottest metal is in the area of the ingate, and the coldest metal farthest from the ingate. For a feeder to exert its fullest influence it must contain hot metal, hence the obvious place for the feeder is close to the ingate, but this is not

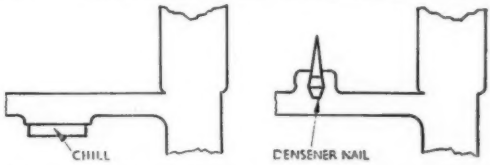


FIG. 6.—*Chills or denseners are used to speed up the rate of cooling of heavy sections.*

always possible, depending upon the part or parts of the casting to be fed With side feeders the problem is simplified a little, because in numerous cases it is possible to gate through the feeder, *i.e.*, the metal runs into the feeder before reaching the actual mould cavity. These conditions ensure that when the mould is full the feeder contains hot metal, and will therefore do its job most efficiently. At the other extreme, a feeder positioned at the opposite end to the ingate will, when the mould is full, contain the coldest metal in the mould cavity,

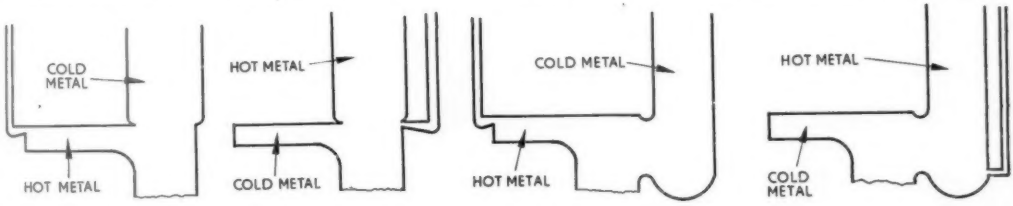


FIG. 7.—*Various methods of placing a feeder head in relation to the ingate. A different position often means that a different size of feeder head becomes necessary.*

Don't forget to use chills . . .

A further aspect of the feeding problem is the use of chills and denseners to even-up the rate of cooling of the metal in the mould cavity. The function of a densener or chill, in this respect, is to extract heat rapidly from the molten metal immediately adjacent to the chill, causing the metal to solidify quicker than under ordinary circumstances. Thus, in a casting which has a sudden change in thus detracting from its efficiency. Very often this loss of efficiency in the feeder has to be countered by enlarging the size of the feeder, so that what is lost in efficiency from temperature is regained by efficiency from mass (*i.e.*, having a bigger feeder to do only the same amount of work). Hence not only the shape, size, and position of the feeder must be considered, but also the position of the ingate in relation to the feeder (see Fig. 7).

Iron-castings Production

Recession reflected in the Industry's Figures

Following the Iron and Steel Board's announcement of iron castings production in the fourth quarter of 1958*, the Joint Iron Council makes the general comment that the continued trading weaknesses in many important industries, which constitute a major proportion of the market for iron castings, largely explains a further reduction in ironfounding production. A detailed commentary is given below.

Total Output

The total output of iron castings in the fourth quarter of 1958 at 814,900 tons (877,600 actual) compared with 962,000 tons in the fourth quarter of 1957 shows a reduction of 15 per cent. For the year 1958, output at 3,403,200 tons (3,468,600 tons actual) shows a reduction of 8 per cent. when compared with the 3,715,100 tons produced in 1957.

Main Sections

The output of iron castings (both grey and malleable) in the fourth quarters and years of 1957 and 1958 is shown in Table 1.

TABLE 1.—*Output of Iron Castings by Sections.*

Section (grey and malleable iron castings).	Fourth Quarter (thousand tons).			Year (thousand tons).		
	1957.	1958.	Percentage change.	1957.	1958.	Percentage change.
Automobile (including tractors) ..	145.1	135.1	− 6.9	519.9	551.0	+ 6.0
Engineering*	338.5	271.3	−19.8	1,320.2	1,170.1	−11.4
Building and domestic ..	146.1	133.5	− 8.6	564.4	498.8	−11.6
Pressure pipes† and fittings ..	133.6	118.5	−11.3	531.6	490.4	− 7.8
Ingot moulds‡	110.0	77.9	−29.2	434.4	354.0	−18.5
Railway equipment	88.7	78.6	−11.4	344.6	338.9	− 1.7
Total ..	962.0	814.9	−15.3	3,715.1	3,403.2	− 8.4

* Including machine tool, textile machinery, electrical, shipbuilding, etc.
† Mainly gas and water.
‡ Mainly for the steel industry.

The year 1958 for most industries has been one of developing recession and for an industry so closely linked to the complex of other major industries some contraction in the rate of production has been inevitable. Amongst the few industries that have been able to expand their markets is the automobile industry, and castings production for this section reached an all-time record in 1958. However, for cast-iron ingot moulds used in steelmaking, pressure pipes and fittings for water and gas mains, drain pipes and gutters for buildings and castings for machine-tools, marine engines and other engineering end-products production was reduced as a result of the adverse trend in the industries concerned.

Raw Materials

A comparative statement of the ironfounding industry's consumption of its principal raw materials is given in Table 2.

* The fourth quarter of 1958 was a 14-week period and the year was a 53-week period. The statistics have been adjusted to a normal quarterly (13-week) and annual (52-week) basis; actual tonnages in the periods, where shown, are placed in brackets.

TABLE 2.—*Pig-iron and Scrap Consumption by Foundries.*

	Fourth Quarter (thousand tons).			Year. (thousand tons).		
	1957.	1958.	Percentage change.	1957.	1958.	Percentage change.
Pig-iron (including refined iron)	553.1	428.2	−22.6	2,159.0	1,856.6	−14.0
Scrap iron* ..	721.9	657.7	− 8.9	2,731.1	2,647.6	− 3.1
Scrap steel ..	104.2	97.9	− 6.0	381.1	396.2	+ 4.0

* About half is foundry circulating scrap.

In the regional figures for iron-castings production, it is an unfortunate fact that the output of Northern Ireland and Scottish founders has been most severely curtailed. In the fourth quarter, for example, their output was 20 per cent. lower than the corresponding period in 1957. On the other hand, grouping together ironfoundry production in the Midlands and the South, there is little or no reduction in tonnage in the fourth quarter of 1958 compared with the corresponding period a year earlier.

Kettering Firm to close Blast-furnace Plant

After having been in continuous production since 1878, the blast-furnace plant of the Kettering Iron & Coal Company, Limited, is to be closed down permanently in about two months' time. The plant is to be dismantled, but the ironstone quarries and roadstone works of the company will continue in operation.

The managing director, Mr. G. H. Johnson, states that every effort will be made to find employment for the men displaced at the works of the parent company, Stewarts and Lloyds, Limited, in the neighbourhood of Kettering. Production of foundry pig-iron by the Stewarts and Lloyds group is to be concentrated at its works in the north Midlands.

Over the past 80 years the company's blast-furnace plant has been almost completely rebuilt on three occasions—the last time in 1932. The company has been a S&L subsidiary since 1956.

ECGD Senior Staff Changes

The Export Credits Guarantee Department of the Board of Trade announces that on the retirement of Mr. E. H. Osborne, Mr. C. P. Rawlings became, with effect from March 2, director of its overseas division. Mr. R. A. Dickinson, who is at present director of the department's short-term underwriting division, will replace Mr. Rawlings as director of ECGD's general division and Mr. D. A. Ward will assume control of the short-term underwriting division, vice Mr. Dickinson. (The overseas division collects and collates economic and status information in connection with ECGD's overseas risks; the general division is responsible for the Department's relations with representative organizations in the United Kingdom, and the short-term underwriting division is responsible for the underwriting of guarantees for consumer goods exported on terms of payment up to six-months credit and certain "quasi-capital goods" (in the engineering field) exported on maximum terms of three years' credit.)

J. LUND, LIMITED, has had plans prepared to extend Eastburn Foundry, Cross Hills, Keighley, Yorks.

Life of Ingot Moulds and Stools

Russian Research on Design and Working Conditions

The following article by D. M. Slonim, engineer at Zaporozhstal Works, USSR, describes how improved life of heavy slab-type ingot moulds was obtained by changing the design, and how the life of stools was improved by incorporating a reinforcing band. This article was originally published (in Russian) in the journal "Stal," 1958, No. 10.

The dimensions of the types of ingot mould used at Zaporozhstal works, USSR, are given in Table 1. Though the rated wall-thicknesses of all the sizes of ingot mould are identical, the walls of type 4 ingot-moulds are actually rather thicker, while those of type 6 ingot moulds are somewhat thinner (comparison of the mould weights makes this clear). In 1956, the depths of the ingot moulds were increased from 1,850-2,050 to 2,200 mm. The designs of all the moulds are similar to that illustrated in Fig. 1. The reinforcing of moulds with steel bands, first introduced in 1954, lengthened their lives by 1½ to 3 times by preventing the development of longitudinal cracks. The lives of type 6 ingot moulds were lengthened the most (from 27 to 76 casts).

Change in Teeming Arrangement

In 1956-57, with the exception of type 1 moulds, their arrangement for teeming was changed from two-row to one-row. The ingot-mould service conditions have deteriorated considerably, since the wide sides, close against one another, are now heated to a higher temperature. As a result, the lives of the ingot moulds were shortened (Table 1), mainly through earlier transverse cracking and wide-side erosion.

The comparatively small reduction in the lives of type 4 ingot-moulds is due to their wall thicknesses being rather greater than the rated thickness (10 mm. greater), and to longer air-cooling before spraying (moulds of this type are seldom used).

Type 7 ingot-moulds are used two to a stool; they, too, are comparatively rarely used. Their arrangement gives them longer lives than type 6, in spite of the less favourable ratio between the dimensions of their sides and the greater weights of ingots from type 7 moulds.

Transverse Cracking

One of the principal reasons why ingot moulds with steel bands eventually become unserviceable is the formation of transverse cracks in their wide sides, which accelerate the breakdown of the inner surface of the moulds and which, when extensive, cause fracture when stripping the ingots. These transverse cracks normally occur in the central region of one or both of the wide sides; they spread along the width and then into the corners and narrow sides. The higher the ratio between the wide and narrow side dimensions, the faster the transverse cracks develop.

Experience has shown that in the service conditions at the works the wall thicknesses of the wide sides of types 3-7 ingot moulds are insufficient; this results in the rapid development of cracks, particularly when the moulds are arranged in single rows on the stools. In consequence the wide sides of ingot moulds were given spherical thickening, according to a design proposed by Yu. A. Tomilin, V. S. Vikharev and D. M. Slonim, in order to lengthen their lives and suppress the formation and development of transverse cracks (Fig. 3 and Table 2).

Thickened-type Moulds

The results of tests made on batches of experimental ingot-moulds are compared, in Table 3, with figures for the lives of conventional ingot-moulds which were in use during the same period. The tests were made on single-row and double-row stools. The comparatively small increase in the weight of the "thickened" type 3 ingot-mould (by 4.6 per cent.) is the result of the height of the rims being reduced in this case to 200 mm. The excessive increase in the weight of type 6 moulds (11.5 per cent.) is due to the poor design of the

TABLE 1.—*Transverse Dimensions and Weights of Moulds (Depth 2,200 mm.) and the Relationship of their Lives to their Layout on the Stools.*

Items.	Ingot mould types.						
	1	2	3	4	5	6	7
Internal dimensions at the base, mm. ..	813 × 915	640 × 990	640 × 1,100	640 × 1,220	640 × 1,350	640 × 1,480	640 × 1,600
True weight of mould, tons	12.65	12.05	13.00	14.35	14.36	14.86	16.10
Mean weight of rimming steel ingot, tons ..	9.3	8.1	9.1	10.1	11.0	12.2	13.3
Mould weight to ingot weight ratio	1.36	1.49	1.43	1.42	1.31	1.22	1.21
Life of moulds with steel bands, layout in two rows, No. of casts	135	—	98	92	85	76	—
Mould consumption, kg. per ton	10.7	—	15.5	16.3	16.1	17.3	—
Life of moulds with one-row layout, No. of casts	—	73	67	81	57	42	50
Mould consumption, kg. per ton	—	20.5	21.4	18.0	22.9	28.8	24.2

TABLE 2.—*Dimensions of Mould Sections (according to Fig. 3) with the Wide Sides Spherically Thickened (mm.).*

Designs as in Fig. 3.	Type of ingot mould.	*a*	*b*	c_1	c_2	d_1	d_2	R_1	R_2	*h*	*l*
A	3*	197	197	400	400	1,050	1,000	2,000	1,800	70	—
	5*	207	207	400	400	1,400	1,300	4,100	3,500	60	—
	6*	207	207	400	400	1,050	1,450	2,000	3,800	70	—
	7	210	210	400	400	1,400	1,600	3,100	4,000	80	—
B	5	210	195	200	300	1,700	1,600	—	—	80	500
	6	210	180	200	300	1,700	1,700	—	—	80	650

* Mould depth 1,850 mm.

thickening (design *B*), and in addition to the fact that the ingot-mould weight was low prior to thickening, owing to the lower-than-rated side thickness. Under normal conditions the increase in weight, due to thickening, of the ingot moulds used at the works, amounts to 5-7 per cent.

Type 3 ingot-moulds were at first used for teeming killed steel; for this they were set up on single-mould flanged stools, using hot tops. After 15 to 20 casts of killed steel, these ingot moulds are used for the teeming of rimming steel until they finally become unserviceable. The partial use of killed steel and the resulting longer time for which the metal is in the moulds, reduces their total lives; the figures for ingot moulds used only for rimming steel and for those used partially for killed steel are, therefore, given separately in Table 3.

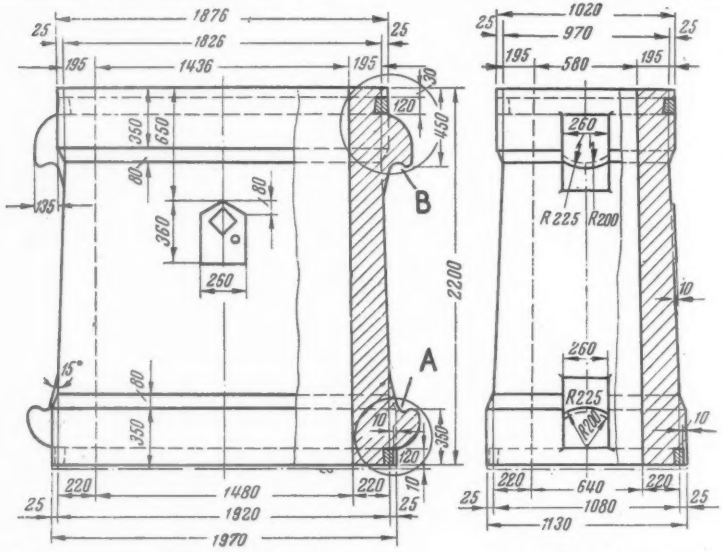


FIG. 1.—*Type 5 ingot-mould design.*

However, when using moulds with design *B* thickening, the consumption was definitely greater since moulds of this type comparatively rapidly become unserviceable through the formation of longitudinal cracks in their narrow walls (particularly in the case of type 6 ingot-moulds). In the majority of cases these cracks originated in a wide side, close to the corner of the upper end, and spread into a narrow side and down its whole height.

Causes of Mould Failure

The steel bands at the ingot-mould ends prevented them from fracturing; however, the cracks spread quickly, and resulted in their becoming unserviceable. In this case the reason for the reduced life is the excessive thickness of the wide sides and the comparative thinness of the narrow sides (Table 2), and also the insufficiently-smooth transition from the thickened portions to the corners and the upper ends.

In the type-5 ingot-mould, at its thickest point, the wide side is 29 per cent. thicker than the narrow side in design *A*, and 49 per cent. in the case of design *B*. The life of a design-*A* mould was 30 per cent. longer than that of a normal mould: the lives of design-*B* moulds decreased, with an increase of 11 per cent. in mould consumption.

Comparison of Designs A and B

In the ingot moulds with spherical thickening, either no transverse cracks whatever appear, or the cracks form later and develop slower than in the conventional ingot-moulds. When two-row stools were employed, the use of design *A* spherical-thickening reduced ingot-mould consumption by 22-24 per cent. (Table 3). When they were mounted on single row stools, 11-18 per cent. less mould consumption resulted.

The variation in length of life of type-6 moulds with types *A* and *B* thickening is particularly great, because in the first case the successful design was combined with favourable service conditions (two-row stools), and in the second case the design was faulty and the service conditions the worst (single-row stools). Ingot moulds with the correct design of thickening most frequently become unserviceable owing to erosion of their inner surfaces, although slowly-developing longitudinal cracks are found in their

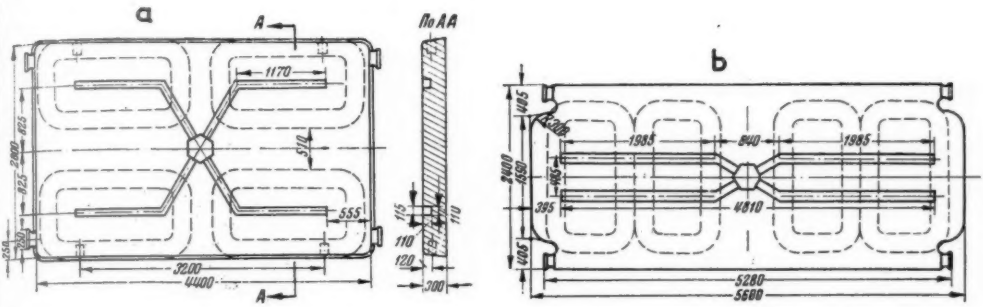


FIG. 2.—*Method of arranging ingot moulds and stools. a—two-row stool. b—Single-row two-runner stool.*

narrow sides, and cracks sometimes appear at the edges of the wide side convexities.

The data obtained are still not sufficient for determining the minimum rational thickening of the wide sides of individual types of ingot mould in different service conditions (ingot moulds with 35- and 50-mm. thickenings will be tested). It has, however, been established that transverse cracking is prevented by a specific degree of thickening of the wide sides; giving the outer surface of a side a spherical shape enables this to be achieved with the minimum amount of iron. Apparently, with a variation in design of this nature the reduction in thermal stresses, due to more uniform heating of the ingot-mould wall, exerts a good effect.

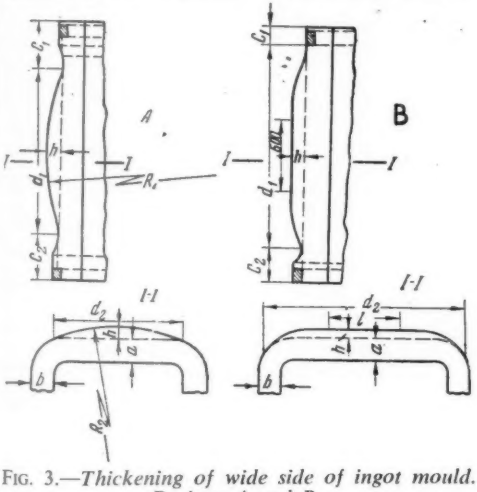


FIG. 3.—*Thickening of wide side of ingot mould. Designs A and B.*

Ingot-mould Stools

Figs. 2, 4 and 5 illustrate one of the principal four-mould stool designs used at the works for the bottom casing of rimming steel, and the arrangement of the ingots on them.

The stools are made of the same iron as the ingot moulds (3.5-3.7 per cent. C; 1.7-2.2 per cent. Si; 0.6-0.8 per cent. Mn). Metal at 1,180-1,220 deg. C. (uncorrected optical-pyrometer reading) is cast into open moulds, and after 10 to 15 min. the surface of the casting is covered with a layer of sand. The stools are taken from the moulds 48 to 60 hr. after casting. The majority of the stools are taken out after 48 hr., when their temperature is 550 to 600 deg. C. Figures for the lives and expenditure of stools are given in Table 4.

TABLE 3.—*Lives of Moulds with their Wide Sides Spherically Thickened (upper figures), and without such Thickening (lower figures).*

Items.	Ingot mould types.*						
	3.	3 (killed).	5.	5.	6.	6.	7.
Fig. 3 thickening design	A	A	A	B	A	B	A
No. of rows on stool	2	2	1	1	2	1	1**
True mould weight, tons (thickened)	11.3	11.3	15.2	15.7	13.5	16.6	17.4
True mould weight, tons (not thickened)	10·8	10.8	14.36	14.36	12.75	14.86	16.0
Ingot mould life, no. of casts (thickened)	125.4	105.3	72.4	54.2	102.3	32.5	60.5
Ingot mould life, no. of casts (not thickened)	92.8	73.8	55.5	55.0	74.2	39.8	49.8
Mould consumption, kg. per ton (thickened)	12.2	13.5	19.1	26.3	13.6	41.8	21.6
Mould consumption, kg. per ton (not thickened)	15.7	17.8	23.5	23.7	17.7	30.6	24.3
Reduction in consumption with sides thickened, per cent.	22.3	24.2	18.7	—	23.2	—	11.1

* The depths of types 3 and 6 ingot moulds, thickened according to design A, are 1,850 mm.; (killed) = killed steel teeming.
** Single row, two moulds.

TABLE 4.—*The Lives of Different Stool Designs.*

Stool design	Stool weight, tons.	Mean weight of ingots on stool, tons.	Ratio between weights of stool and ingot.	Number of stools tested.	Mean life, casts.	Expenditure, kg. per ton of steel.
		Two-row Stools.				
As in Fig. 2(*a*)	26.5	32.8	0.81	—*	144	5.6
		Single-row Stools.				
Two-runner reinforced (Fig. 2(*b*))	26.0	37.4	0.70	81	100	6.9
" " " at the ends	26.0	37.4	0.70	18	100	6.9
" " " by bands	26.0	37.4	0.70	28	121	5.7
Single-runner unreinforced	26.3	37.4	0.70	48	46	15.6
" " reinforced at the ends (Fig. 4) ..	26.3	37.4	0.70	51	53	13.3
" " " by bands ..	26.3	37.4	0.70	31	70	10.0
" " with displaced runner, reinforced by bands	26.3	37.4	0.70	7	138	5.1

* Figures for the year.

The principal cause of damage to two-row stools (Fig. 2 (*a*)) is erosion of the working surfaces. After a considerable number of casts, transverse cracks appear at the sites of erosion in certain stools; these cracks develop comparatively slowly. The single-row two-runner stools (Fig. 2 (*b*)) become unserviceable mainly owing to longitudinal and transverse cracks, or sometimes to angle cracks and erosion. The longitudinal cracks normally develop comparatively slowly; they appear in the non-working surface, and spread to the end and then between the runners or along one of them.

The transverse cracks almost always appear beneath the centre (the small transverse cracks in other localities do not normally develop).

After a crack has extended over 60 to 80 per cent. of its cross-section, a stool breaks; at the edges the whole thickness of the fracture is bright, while in the centre it is oxidized. This type of transverse-crack development is found in stools whose life has been increased. The development of transverse cracks under the first ingot is explained by the fact that this is the sector of the stool heated to the highest temperature.

One-row single-runner stools (Fig. 4) have a number of advantages over the two-runner types; with a single runner the amount of runner brick used is less, it is easier to break away the ingots, and the labour expended on preparing the set-up is less. However, the lives of one-row single-runner stools proved to be only half the lives of two-runner stools. All the single-runner stools become unserviceable through the formation of longitudinal cracks commencing along a runner and rapidly spreading along the entire length of the stool.

At the same time as using stools made at Zaporozhstal, two-runner and single-runner stools made at the Novo-Kramatorsk machine-construction works (NKMZ) and single-runner stools, from the Kramatorsk heavy-machinery works (KZTS), were also used. At these works the stools are cast into closed moulds and cooled for several days before removal. The NKMZ stools have about the same length of life as those produced at Zaporozhstal (the compositions of the NKMZ iron and that smelted at the Zaporozhstal works are similar). The KZTS stools, owing to the reduced carbon content of the iron (3.33-3.5 per cent.) only last for 25 to 35 casts.

The formation of the longitudinal cracks which have been described, in single-row stools, is associated with the location of the ingot thermal centres and the highest thermal stresses along the axes of the stools. Since the runners almost halve the stool section strength, the closer they are located to the stool axis, the more often will a longitudinal crack form along a runner. In single-runner stools (Fig. 4) the runner is located along the stool axis; this explains their rapid destruction through longitudinal cracking alone.

The fact that transverse cracks develop more rapidly in single-row two-runner stools (Fig. 2 (*b*)) than in two-row stools (Fig. 2 (*a*)) is due to the lesser width of the single-row stools and the closer spacing of the ingots. The close location of the runners favours the expansion and deformation of the iron between the runners, and this accelerates the formation of transverse cracks in this locality.

Reinforcement made of types 15 or 25 cast steel was used to lengthen the lives of single-row stools. The end reinforcement (Fig 4) did not greatly increase stool life (Table 4). Here, too, breakdown was caused by longitudinal cracks, while in the majority of cases the reinforcement fractured with no sign of any plastic deformation.

In some cases the end reinforcement remained undamaged, but

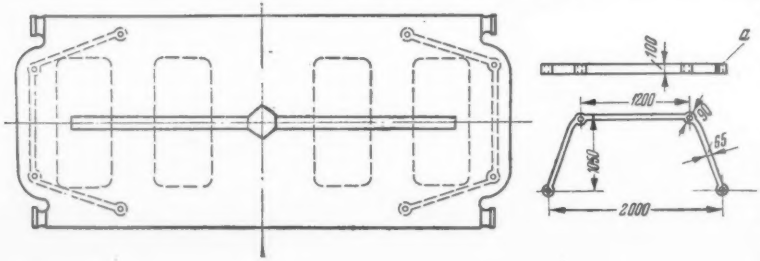


FIG. 4. — *Single-row single-runner stool with end reinforcements. a—Apertures for supporting rods.*

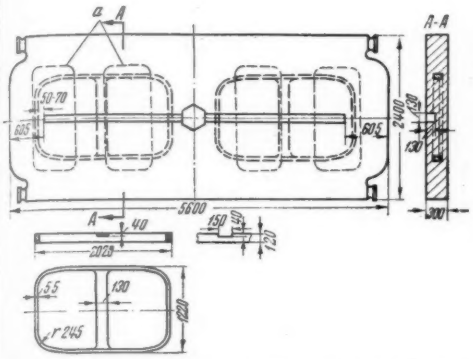


FIG. 5.—*Single-row single-runner stool reinforced by bands. a—Ingot positions.*

a crack nevertheless spread the whole length of the stool, and it was taken out of service owing to the possibility of steel running out through the end joints between the runner bricks. Investigation of test pieces of the reinforcement cast into the stool showed that it is carburized to a depth of up to 4 mm. (the depth of the eutectoid layer is 1.5 mm.); the steel grain size is estimated at 4 to 5 (according to State Standard 5639-51).

Use of Reinforcing Bands

Reinforcement by means of bands as proposed by E. I. Parshin (Fig. 5) increased the lives of single-runner stools by roughly 50 per cent.; but this was still well below the length of life of the two-runner un-reinforced stools. Longitudinal cracks were, in this case too, the principal reason for the reinforced stools becoming unserviceable. The higher efficiency of reinforcing stools with bands is explained by the fact that the runners are strengthened at several points, this preventing both longitudinal and transverse cracks from forming.

It should be taken into account that erosion cracks often appear in the working surfaces of stools, beneath the ingots, along the band circumference; these develop to considerable sizes, though they do not result in stool breakdown. This defect is observed where, owing to its warping the band is located too close to the working surface of the stool.

Both methods of reinforcement were also tried on two-runner single-row stools (similarly applied). In this case also, end reinforcement did not provide good results (Table 4), Reinforcement by means of bands greatly lengthened the lives of stools, and this was assisted to a considerable extent by the simultaneous elimination of certain shortcomings in the manufacture of the stools (variations in thickness and the formation of sharp moulded edges). In the two-runner stools, no reinforcing-band fracture occurred, and the longitudinal and transverse cracks which appeared developed slowly; the stools became unserviceable through erosion.

The working advantages of the single-runner stools and the longer lives of the two-runner type were successfully combined by a design of stool with the runner displaced (Fig. 6). The results of tests made on seven stools of this pattern are given in Table 4. Large ingot moulds (types 5-7) were set up on them in the same way as on the two-runner stools (Fig. 2 (*b*)). Smaller-size ingot-moulds were displaced somewhat (equally) to either side of the longitudinal axis of the stool.

In this type of stool, erosion is slower than in the two-runner type (owing to the fact that there is no narrow superheated gap between two runners in the single-runner type).

Conclusions

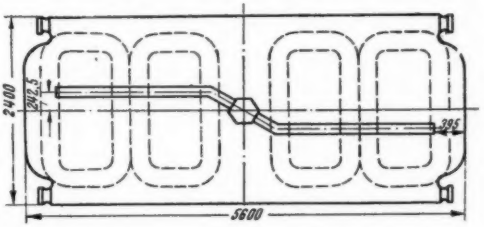
(1) The single-row arrangement of ingot moulds on a stool, with their wide sides close together, greatly reduces their lives, owing to the more rapid development of transverse cracks and erosion.

(2) The formation of transverse cracks may be prevented by adequate thickening of the wide sides of ingot moulds. This may be done for the lowest expenditure of iron by giving the outer surfaces of the mould walls a spherical shape. Where the ratio between the wide and narrow sides is correct and the thickening merges evenly into the normal-thickness wall, the use of spherically-thickened wide sides reduces the expenditure of various types of ingot mould by 11 to 24 per cent.

(3) The lives of stools depend to a great extent on the displacement of the ingots and runners, being greatly reduced where the runner is located along the line of highest thermal stresses (along the longitudinal axis of the stool).

(4) Reinforcing by means of cast-steel bands, cast into the bodies of the stools, compensates the effect of the unfavourable displacement of the ingots and lengthens the lives of the stools.

FIG. 6.—*Single-row stool with offset runner.*



WOODALL-DUCKHAM, LIMITED—Mr. James Simpson, deputy chairman of the Woodall-Duckham Construction Company, Limited, has been appointed deputy chairman of the company, which is the parent company of the Woodall-Duckham group.

TUBE INVESTMENTS, LIMITED—Major-General Sir Francis de Guignand and Mr. E. L. Burton have been appointed to the board. Mr. Burton will continue to be secretary of the company. Sir Francis has been in charge of TI's interests in South Africa since 1949.

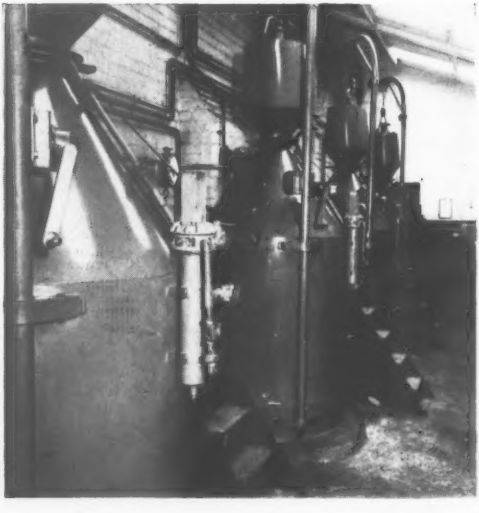
Equipment & Supplies

Acetylene Generator

The JOURNAL'S representative was invited recently to the Edgwick Works of Alfred Herbert, Limited, founders, and machine-tool manufacturers, to inspect their facilities for on-the-spot generation of acetylene. The low cost of generated gas, plus its greater convenience, were stated to be the two points which influenced the firm's choice of generation, instead of using dissolved acetylene supplied from cylinders. The very considerable amount of this gas used at Alfred Herbert's for flame-hardening purposes is wholly generated on the premises. At this works, flame-hardening treatment is applied *inter alia* to slideways and other wearing surfaces of large and small castings in the production of lathes, drilling machines, milling machines and ancillary equipment. Acetylene is also used for local flame-softening, which is sometimes required before such operations as drilling.

The generator installation comprises four model-200 "Aut-O-Cet" units (Fig. 1). These are of the water-to-carbide type made by Weldcraft, Limited, 26, Purley Way, Croydon. Each of these has a water tank of 200-gall. capacity, and takes a charge of 200 lb. of 14-mesh dust-free calcium carbide and generates about 1,000 cub. ft. of gas at the rate of approximately 200 cub. ft. per hour. Three are normally in use, with one held in reserve, although occasionally it is necessary to run all four at the same time in order to provide sufficient gas during peak loads. One part-time operator is employed in the generator house; he is responsible for draining the generators, re-charging with calcium carbide (a 25-min. job for each unit), operating a filter press used to separate water from the hydrated calcium-oxide waste product, and for general maintenance work. At the works, the construction, operating procedure and safety features of the generators were explained and the re-charging operation and sludge disposal demonstrated. Generator maintenance was reported to be a simple procedure entailing six-monthly replacement of filters, orifice plates and diaphragms. The generator house is sited adjoining the factory; all electrical switches are of the flameproof type and are placed outside the building—to conform with factory regulations—and the electric lights shine into the house through Perspex windows in the roof. Risk of explosion is further minimized by using non-sparking tools for certain operations within the building. (These considerations, of course, are not peculiar to this plant, since they apply to all buildings where explosive gases are produced or housed.)

FIG. 1.—*Battery of four Model-200 "Aut-O-Cet" acetylene generators at the Edgwick Works of Alfred Herbert, Limited, Coventry.*



This model of generator is approved by HM Home Office for use, in suitable premises, at a working pressure of 15 lb. per sq. in. Gas is only generated when gas is being consumed, hence, the generator can be shut off for weeks without deterioration of the carbide or the evaporation of water. At Alfred Herbert's works, the generated gas, as explained earlier, is used mainly for surface-hardening treatment of iron castings and some steel components. However, there would appear to be no reason why other large users of acetylene in foundry processes—for example, steel-founders (for oxy-acetylene cutting)—should not generate gas themselves. It is strongly recommended, however, that for sizable installations, the set-up in Coventry be taken as an example of good practice, leading to maximum safety and efficiency.

British Railways Tote System

Since British Railways (London Midland Region) introduced in November the "Tote" system for such commodities as powders, oils, blacking, and the like, the demand has increased considerably. One firm which began with 50 bins for carbon black now hires 500. Traders dealing with clay, activated carbon and pitch are other enthusiastic users. In this system, British Railways hire tote bins to traders at an annual hire charge, thus relieving them of capital outlay on sacks. The trader can also stencil his name on the bins for advertising purposes. Free return of the empties to loading points is permitted. Other advantages of this system to the trader include bulk-purchase discounts, the fact that there is no bag or sack handling, and no wastage through spillage. The railways gain by greater ease of handling, reduced amount of handling, less discharge time, and the use of ordinary open wagons instead of special tank or hopper vehicles.

Gear-speed Control

Carter Gears, Limited, Bradford 3, Yorkshire, are marketing a combined handwheel and speed indicator for controlling variable-speed gearing. It requires approximately 8½ turns to cover the full speed range (maximum speed forward, through zero to maximum speed in reverse), and may be fitted at either side of a Carter gear. Output speed is approximately in direct proportion to handwheel movement, that is, equal handwheel movements from any position effect equal output speed changes in r.p.m. If only one direction of output shaft rotation is required then details of this shaft rotation should be submitted, in order that suitable control stops may be fitted to the Carter variable-speed gear.

THE RUBERY OWEN GROUP has formed a RowenArc division to manufacture under licence, in Britain, a revolutionary type of arc-welding equipment developed by the Westinghouse Electric Corporation of Buffalo, New York, and known in America as West-Ing-Arc.

Symposium on Gases in Light Metals

The following paragraphs are extracts from papers given at a recent meeting in America of a section of the American Society of Metals. The symposium was given on February 17, under the chairmanship of Mr. W. S. Peterson.

Causes, and Solubility, of Gases in Aluminium and Magnesium

By R. S. Busk (Dow Chemical Company)

The author reviewed general theory and defined (*a*) diffusion, (*b*) pressure, and (*c*) solubility.

Aluminium: He referred to Ransley's work, which had indicated that more gas was in solution in pure aluminium than in its copper or silicon alloyed modifications. As in other metals, hydrogen dissolved more rapidly in liquid metal than in solid, and solubility increased with rise in temperature to three times greater at the melting point of the metal, and six times greater on further heating, *viz:*

Solubility

Solid	660 deg. C.	—0.36 cc. per 100 gms.
Liquid	680 deg. C.	—0.69 cc. per 100 gms.
,,	850 deg. C.	—2.15 cc. per 100 gms.

Magnesium: was like aluminium in the solid, he said, but protective films shielded its surface when it was molten, thereby lessening gas absorption, *viz:*

Solubility (ppm)

Solid	640 deg. C.	—30.7
Liquid	675 deg. C.	—46.5
,,	725 deg. C.	—60.1
,,	775 deg. C.	—63.1

Magnesium was less plagued with pinholes than aluminium, however, and the source of hydrogen was (*a*) the atmosphere; (*b*) contaminated or oily scrap; (*c*) mould sand, and (*d*) the furnace (combustion products).

Gas-content Measurement by Vacuum

By C. L. Brooks (Reynolds Metals Company)

The author described a vacuum system for measuring gas content. The test apparatus was mobile, being mounted on a tea-trolley type of vehicle.

Test Procedure: A 100-cc. cup of Armco iron, one third- to one half-full, constituted a sample. Tests were completed in five min., with most of the gas being evolved in one or two min. A rapid density test supplemented the gas evacuation test. The author showed test samples illustrating (*a*) high gas content—a bread-loaf top; (*b*) medium gas-content—a flat top, and (*c*) low gas-content—a sunken top.

Degassing: In practice, use is made of a 90-per cent. nitrogen and 10-per cent. chlorine mixture to degas melts, a 400-lb. batch of aluminium requiring 5 cub. ft. per hr. A 30-min. treatment reduced the gas content to a negligible amount, whereas treatment with nitrogen alone took three times as long.

Rapid Methods of Gas Measurement

By C. E. Ransley (British Aluminium Company, Limited)

An instrument of the suction-tube type, which was immersed in the liquid metal to test its gas content, was described by the author. For wrought alloys, a gas content of 0.05 to 0.10 cc. per 100 gm. was considered the maximum that could be allowed, he said. Certain permanent-mould castings, which might be difficult to feed, could however, tolerate a higher gas-content in order to reduce volume shrinkage. The test instrument described needed to be developed further before being considered satisfactory, the author concluded.

Degassing Agents for Molten Light Metals

By J. E. Dore (Olin Mathiesen Chemical Corporation)

Degassing agents of three types were described: (*a*) gas type; (*b*) solid type, and (*c*) liquid type. Amongst the gases used were: (*a*) Cl_2; (*b*) BF_2; (*c*) N_2, and (*d*) argon and helium. The solids were usually salts containing chlorine of the materials used.

Chlorine gas was considered the best for degassing, but it had a disadvantage, namely toxicity Solid ("Hexachloridethane") was good for batch use, although control was poorer than with chlorine. $AlCl_3$ (solid) was fairly good, with control poorer than Hexachloridethane. It was cheap, and produced a dry dross. The original material was subject to moisture absorption, and needed care in handling. Nitrogen (gas) was considered less efficient than the others.

In the discussion which followed, use of 5 per cent. Cl with 95 per cent. N_2 was stressed as being equal to chlorine, and less noxious and corrosive.

Degassing Large Aluminium Melts

By J. J. Wegner (Kaiser Aluminium and Chemical Company)

The author described commercial-sized devices which had been developed for degassing large melts of aluminium. The process consisted of bubbling or stirring the metal from its underside, in the crucible, by means of pipes or bottom channels.

Publications Received

Practices Impeding the Full and Efficient use of Manpower. Published for the Ministry of Labour and National Service by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 1s. net.

Since there has been passed the Restrictive Trade Practices Act, which makes it incumbent upon employers' associations to register their agreements, it was considered only fair that practices followed by labour which might not be in the public interest, should likewise be enquired into. The result is this present Report of an enquiry undertaken by the National Joint Advisory Council, representing employers, trade-union officials and the nationalized industries. To the reviewer's mind, the enquiry was abortive and the tacit understanding that one industry deals with one trade union is untrue. In an appendix to the Report a long list is given of industries where the enquiry showed that no manpower problems exist, and the majority probably enter into this category. One of the main difficulties in deciding whether or not labour is indulging in restrictive practices lies in the demarcation of jobs. In different parts of the country there are different rules as to what men may regard as coming within the scope of their jobs; the reviewer believes that in some foundries moulders are barred from coremaking, for example. Unfortunately the word demarcation does not appear in the Report. In the reviewer's opinion, the Report is certainly not worth the shilling asked for it.

Films for Industry—A Catalogue of Industrial Films. Published by the Central Film Library, Government Building, Bromyard Avenue, Acton, London, W.3; price 3s. 6d.

If patternmaking be included, then in this catalogue there are 33 films listed as dealing with foundry practice, though it would seem that some of them are quite old. Thus, the reviewer suggests that in future editions, the date of release should be given. Nevertheless, the publication is useful to keep available, for then each successive edition discloses just what is newly issued. Among the "foundry" titles there are two or three films quoted, which look attractive, and which the reviewer does not remember seeing personally.

"The Engineer" Buyers Guide. Published by The Engineer, 28, Essex Street, Strand, London, W.C.2; price 9s. 3d. post free.

This guide contains 1,802 entries from firms either advertising in *The Engineer* or the actual guide, so it is not comprehensive, yet it is extremely useful. Actually, in a purchasing office there cannot be too many works of reference of this character and the reviewer ranks this one as amongst the most valuable. It has its own special sections and is unique, so far as the reviewer is aware, in containing a calendar of 1959 exhibitions. The list of technical associations connected with the engineering industry is excellent and better than usually found in books of this type.

Properties and Characteristics of Aluminium Casting Alloys. Published by the Association of Light Alloy Refiners and Smelters, 3, Albemarle Street, London, W.1; price 4s. 6d.

The reviewer does not believe that because a small charge is being made for this publication, that fewer copies will reach the actual foundries, for it is very good value for money. It runs to over 100 pages and includes ten tables. Whilst to the layman there would appear from these tables to be a plethora of aluminium casting alloys, in actual practice a matter of half a dozen cover most industrial requirements. Table X which deals with standard colour-marking of alloys reveals a much-used system, the general extension of which would confer great benefits on the whole of the light-alloy industry.

In the case of each alloy information is given as to chemical composition; mechanical and physical properties; machinability; corrosion resistance; anodizing; casting characteristics; heat-treatment and applications —a veritable encyclopaedia. Whilst the book is useful for the founder, it is also a valuable work of reference for the designer.

Transport Age, Vol. 2, No. 8. Published by the British Transport Commission, 222, Marylebone Road, London, N.W.1.

The very high standard established initially for this magazine has been well maintained in this issue. There is, for instance, a delightfully illustrated article "Where Salmon Run," which cannot fail to arouse nostalgic memories of those whose hobby is fishing. Of a more practical aspect are articles on containers, zonal collection and delivery, the South Wales Ports and a number of similar well-illustrated contributions from authoritative writers.

LLU Translations Bulletin. Published by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 4s. 6d.

The letters LLU stand for the Lending Library Unit of the Department of Scientific and Industrial Research. The objective of the *Bulletin* is to provide interested parties with information as to the availability of translations of recent Russian scientific and technological literature. Whilst in these foundry practice scarcely figures at all, metallography and metallurgy are dealt with.

Careers Guide—Opportunities in the Professions and in Business Management. Published for the Central Youth Employment Executive by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 3s. 6d. plus postage.

The only reference in this book to the foundry industry as a potential career for youths, appears in a list of booklets in the "Choice of Careers" series. Whilst the police and prison services are regarded as professions, apparently foundry technology is not!

Report and Accounts for Employees. Issued by Stewarts and Lloyds, Limited, Birmingham and elsewhere.

Using letterpress in simple English and clever annotated illustrations, this brochure gives to the ordinary man-in-the-street an excellent account of a year's financial results achieved by this large group of companies.

Notes on Laboratories for the Teaching of Chemical Engineering. Published by the Institution of Chemical Engineers, 16, Belgrave Square, London, S.W.1.

This is the type of publication, the usefulness of which is obvious. Thus, the idea could well be emulated by other industries.

SUMMATION METERING EQUIPMENT for the Kariba hydro-electric scheme valued at about £47,000 has been ordered from Ferranti, Limited, Hollinwood (Lancs). The order comprises precision-grade integrating meters, electro-mechanical summators, printometer demand recorders and suites of metering cubicles.

Hot-tinning Technology

The 1958 annual report issued by the International Tin Research Council* contains the following reports of special conferences on hot-tinning held during the period reviewed:—

Paris Conference

At the Maison de la Chimie, Paris, 120 persons attended the seventh annual *Journée de l'Etain*. The theme was hot-tinning and the aim was to show how this traditional process had been modernized for high-speed mass-production. Mr. A. de Buyer (president of the *Chambre Syndicale des Fabricants d'Articles Galvanisés et Etamés*) was the chairman. All the speeches and discussion were in French.

Dr. Hoare spoke on the principles of the hot-tinning process and gave numerous typical examples of successful mechanization in industry, illustrating these with slides. Mr. J. Mantelet (chairman and managing director of Société "Le Moulin Légumes") spoke on the mass-production of tinned wares for domestic use. After a short interval for discussion and refreshment, Mr. Thwaites spoke on the "Direct-Chloride" method of tinning cast iron which was developed by himself and his colleagues at the Tin Research Institute. Mr. L. Mésager (director, Etablissements Mésager) concluded with a talk on the methods adopted when tinning a diversity of wares. A discussion on all aspects of hot-tinning then followed and the conference ended with the showing of a film on hot-tinning produced in the Tin Research Institute's laboratories.

Düsseldorf Conference

The conference on November 27 was the fifth in this annual series. The subject of this conference was also hot-tinning and how it had been mechanized. About 230 persons were present in the hall of the *Kunstlervereins Malkasten*. Mr. M. Benscheid (chairman, *Verbandes der Deutschen Haushalt Maschinen Industrien*) presided. All the speeches and discussion were in German.

Dr. Hoare reviewed the requirements of hot-tinned coatings and spoke of the need for mechanization, showing slides of some recently installed plants. Dr. Keysselitz (*Zinn Informationbüro*, Dùsseldorf), spoke on the maintenance of hot-tinning baths and discussed the extent to which it was desirable and possible to separate the iron and copper compounds which form in them. He also described the chemical reactions which occur in fluxing and tinning. Dr. Hedges' paper was read by Mr. Lewis, and in this reference was made to the special difficulties in tinning cast iron due to the graphite flakes in the surface requiring appropriate methods for their remedy. It was stated that the Institutes "Direct-Chloride" process gave results which were unattainable only a few years ago, and slides were shown of food mincers, bearings and other articles in support of this claim. Dr. Kuhn (Degussa, Frankfurt) described the Kolene method of tinning cast iron. In this method the graphite is removed by anodic oxidation in a fused eutectic salt-mixture. Dr. Kuhn said that excellent adhesion was obtainable in bearings lined on cast-iron shells using the Kolene method.

There was a long and interesting discussion after each paper and the meeting ended with the showing of the coloured film of hot-tinning techniques, taken in the Institute's laboratories.

* From the Tin Research Institute, Fraser Rd., Greenford, Middlesex.

News from Africa

Iron Deposits at Gara Djebilet

Specialists are now working to determine the extent of the iron-ore seam at Gara Djebilet. This seam, which is considered to be one of the most important in Africa, is situated about 75 miles south of the oasis town of Tindouf, approximately 125 miles from the Moroccan frontier. The reserves have been estimated to be at least 400 million tons. The future working of the seam will be governed not only by its mineral potentialities but also by the problem of transporting the ore out of the country to the Atlantic coast. This poses political problems, for transport routes would lie across Spanish territory either through Seguiet el Hamra or the Rio de Oro. The camp which is carrying out the preliminary work on the deposits has been installed by the African Industrial Bureau, which is closely connected with the Common Organization for Sahara Regions.

Chrome Mining

One of the four biggest producers of chrome in Southern Rhodesia, Mapanzui Chrome Mines, Limited, has exercised an option to mine chrome in the Belingwe Native reserve. The price paid is about £40,000. The company has already invested another £30,000 in development work, and plans to spend £50,000 more to bring the mine into production. The company's managing director, Dr. D. Fawcett Phillips, has stated that eventually the company hopes to produce a steady 3,000 to 4,000 tons a month. Development work now in progress includes the provision of a private railway-siding and the laying out of about 22 miles of road.

Rhodesian Castings' Expansion

A Gwelo foundry, Rhodesian Castings, Limited, has announced that it is to spend £100,000 on plant for the manufacture of enamelled cast-iron baths and basins. Plant to the value of £85,000 has been ordered from Britain, and plans are in course of preparation for extensions to the factory which will cost £15,000. Construction of the building is to commence next January and the plant is expected to be ready for production by the middle of the year; when completed it will be the first of its kind in the Federation.

In an interview with the works manager, Mr. V. McGowan and the company secretary, Mr. C. Behr, it was stated that about 10 European and 125 African additional staff would be required to man the plant—all the Europeans would have to be technicians. The present foundry's electric-power consumption will go up by 60 per cent. and the foundry will consume more pig-iron from Risco and more coke from the Wankie Collieries. The principal machinery in the new plant will be an electric enamelling oven capable of processing 18 baths an hour; grinding and mixing machinery for the preparation of coloured enamels; pneumatic moulding machines and coke-burning melting cupolas. Mr. McGowan and Mr. Behr said the company planned to meet the Federation's future need of enamel baths, basins and lavatory suites. It was hoped to export about 20 per cent. of the foundry's output, principally to East Africa, the Belgian Congo and New Zealand; at present most enamelled bath and basinware was imported into the Federation from South Africa, smaller quanities were imported from overseas.

This news contrasts with recent reports of temporary production cuts in other industries in the district—at Rhodesian Alloys in Gwelo and at Rhodesian Chrome Mines at Selukwe.

E.

Foundry Exhibits in the Science Museum

A new gallery, devoted entirely to iron and steel, was recently opened at the Science Museum, South Kensington. Most of the cost (£60,000) was provided by the British Iron and Steel Federation. An account of a visit to the Museum by the Journal's representative is given below, together with illustrations of some of the exhibits.

A newly equipped iron and steel section was recently opened at the Science Museum, South Kensington, London.* Refurbished at a cost of some £60,000, it presents a pleasing compromise between modern exhibition showmanship and the traditional decorum of a museum. The JOURNAL'S representative was privileged to be shown round by the assistant keeper, Mr. W. Winton, who is really enthusiastic on the subject of the history of foundry practice. On such occasions, one learns not only the history of an exhibit, but often an equally interesting story as to how it entered into the possession of the Museum. A letter appearing in "The Times," or the obstinacy of a works manager in refusing to sell a piece of plant to the scrap merchants, are amongst the various interesting stories behind the exhibits.

* A short account of the opening ceremony is given on page 191 of the February 12 issue of the JOURNAL.

Historical Notes

Cast iron presents a curious history. First came the general production of a sort of wrought iron—then the production of direct iron castings in Tudor times. An interesting discovery has been recently made in China. It was originally thought that the production of iron castings in China dated from the beginning of the Christian era, but a series of castings made round about 400 BC have now been found. The Museum authorities have been fortunate in receiving from China—in well-made, silk-lined, padded boxes with ivory closing pegs—a series of plaster casts of these castings, coloured so as to give the appearance of rust-coated tools. These tools (sketched in Fig. 1) were excavated in 1951 on the site of a peasant hut in Hui-Hsien, in the P'ing Yuan province, and are now on display in the New Historical Museum, Imperial Palace, Peking. The various wooden haftings shown were suggested by the Chinese Museum staff. Three of these moulds—one for axes, one for hoes, and one for chisels, are shown in Fig. 2 (*a*) to (*c*).

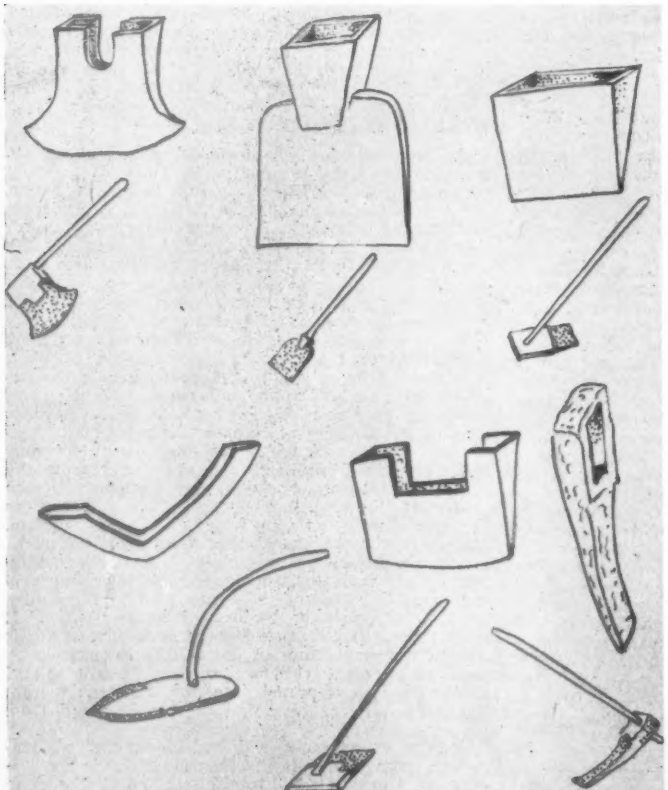


FIG. 1.—*Cast-iron tools, of Warring States period, excavated in 1951 from Hui-Hsien in the P'ing Yuan province. The sketches were made at the Imperial Palace Museum, Peking.*

An Antiquarian Puzzle

Fig. 3 shows a picture and line drawing of a casting which has been offered to the Museum

FIG. 2.—*Moulds, of the Warring States period, for (a) axes; (b) chisels, or two-pronged hoes, and (c) ordinary hoes.*

by Mr. Rex Wailes, a celebrated historian of windmills. The casting, possibly a ladle, is alleged to be a genuine relic of the Kentish ironworks, and came from Furnace Mill, Hawkhurst; its actual use is, however, unknown. There is a photograph of Furnace Mill on page 321 of the book "Wealden Iron" and although its author, Mr. Straker, himself thoroughly examined the casting, he would not commit himself as to its purpose. Tradition has it that the small jobbing foundry at Hurst Green is very old-established, and in a letter written to Mr. Wailes in 1957, a Mr. John Russell quotes an old inhabitant, Mr. Frank Warren, as having said that

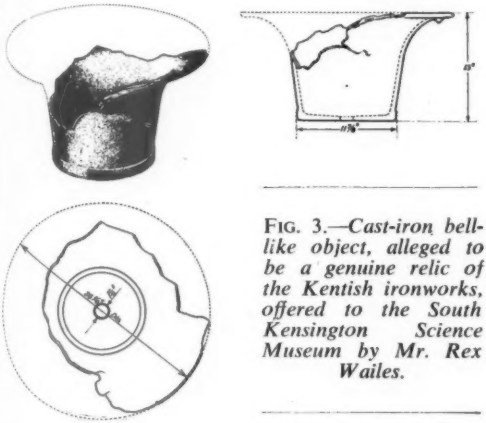


FIG. 3.—*Cast-iron bell-like object, alleged to be a genuine relic of the Kentish ironworks, offered to the South Kensington Science Museum by Mr. Rex Wailes.*

he remembered ladles exactly like the one shown being used there. This letter does not, of course, establish the casting as a genuine product of the Wealden Iron Industry.

An outstanding exhibit at the Museum is a particularly fine replica made by Mr. C. C. Booth J.P., of Burnham-on-Crouch, of a fireback, showing on one half the founder and his resources, and on the other his material wealth. The original fireback is in the museum of the Sussex Archaeological Society at Lewes.

"Brighter Outlook" for Power-Gas Corporation

Paucity of large comprehensive contracts has had an adverse effect upon the order-book of the Power-Gas Corporation, Limited, but the chairman, Mr. W. R. Brown, reports that "1959 has dawned with a brighter outlook than was foreseen a few months ago." Orders booked in the year to September 30, 1958, amounted to £9,250,000, only 73 per cent. of the levels reached in 1956 and 1957.

Group net profit advanced to £532,107 (£356,279), much of it stemming from contracts that were begun as much as four years ago. Other large contracts, now approaching a profitable conclusion, would affect the 1959 accounts, and some would even carry over into 1960.

Efforts to obtain work from new sources were sufficiently successful to ensure full employment in all departments, although, since the end of the financial year, the ironfoundry has been operating on short time.

The dividend is raised from 15 per cent. to 20 per cent., of which 5 per cent. is in the form of a special interim for 1958-59. A further interim for 1958-59 of 7½ (5) per cent. is foreshadowed.

British Bronze and Brass Ingot Manufacturers' Association

At the annual meeting of the British Bronze and Brass Ingot Manufacturers' Association, held last Tuesday at the Queen's Hotel, Birmingham, Mr. F. Baugh presiding, Mr. J. H. Barwell, J.P., was elected president, and Mr. T. C. James and Mr. J. H. Cohen, vice-presidents. A panel was formed to study and report on fume and dust extraction within this industry.

Notes from the Branches

Lancashire

On the afternoon of February 7, the Lancashire branch of the Institute of British Foundrymen met at the Midland Hotel, Manchester, to hear a paper on "Foundry Management" presented by Mr. A. Kirkham, B.SC. (managing director, James Smethurst & Son, Limited). A series of excellent slides was used by the author to illustrate his paper, which dealt with the basic principles of foundry management, and the requirements of small mechanized and jobbing foundries. The lay-out, building, basic management and working conditions required to give an effective production unit were outlined, and methods of labour-selection, -training and -utilization, as well as the effects of post-war conditions, of labour, sales and general economics, etc., were commented upon.

At the conclusion of the lecture the meeting was open for discussion which, at first, centred on the qualities to be looked for when choosing a man to be manager of a foundry. Mr. Kirkham said the practical type of man would be his choice, providing he had (*a*) understanding of foundrywork and (*b*) an ability to respond to training in the economics of the foundry. He could see no objection to asking applicants for jobs to fill in application forms which asked for particulars such as height, weight, and whether or not a man was married. This data was useful to the interviewer in helping him to formulate questions in advance; usually a married man was the more reliable worker; weight and height gave an indication of physique.

The discussion then turned on management in general, one member saying that he thought management had deteriorated since the last war; it was confusing when a decision taken one month was reversed the next. The lecturer said that a capable foundryman would take such matters in his stride. He went on to say that the foundry industry must be able to meet changing conditions, be alive and able to meet competition—especially from fabrications. As to technical training, Mr. Kirkham agreed with a speaker that this was an all-important background to management—in fact, all places at the Foundry College and Training Centre were booked months beforehand. He also agreed that in 99.9 per cent. of cases, practically-trained men should be selected for further management training in preference to graduates from college.

New Rates on Jobs

On the question of new rates or times on jobs being set by planning engineers when a foundry is moved to a new site, he said that consultants from outside a firm often saw things from a new angle. It was an essential preliminary for foremen to get to know as much as consultants about costs; then it was most important that there should be 100 per cent. co-operation between consultants and the departmental foremen. Referring to Mr. Kirkham's statement that too few foundrymen became managers, a speaker thought there was a danger in having a technical enthusiast occupying the top position. Replying, the author contended the average foundryman with the right economic outlook would be superior to the accountant for such a position.

On other topics, he said personnel departments were a luxury in a small foundry, and in the event of a personnel manager dictating to a manager as to the training of an apprentice, an apprentice training committee should decide where the boy should be placed; management on the Continent generally appeared to be no better than ours, but incentives were greater in Germany, for instance; for apprentice training, facilities seemed better both in France and Germany than they were in the UK.

In reply to a question as to the percentage of profit per year which should be used for research—for a foundry employing 300 people—Mr. Kirkham thought that 25 per cent. profit would be the correct allocation. As to what advice he would give to a boy contemplating entering the industry, he said that in spite of the fact that a number of foundries had closed down recently—possibly because of errors in costing—there was plenty of scope for young people, and he would advise them to go into the industry especially because of the lack of well-trained managers. In reply to the allegation that most of the foundries which had closed were "tied" foundries, Mr. Kirkham said that type of foundry had many overheads not borne by the "free" foundry. However, in some cases "tied" foundries were being subsidized, say, by a finished-goods department and this could sell castings very cheaply on the open market.

There would still be a demand for well-trained managers 20 years hence provided the industry continued to produce castings economically, he concluded.

Beds & Herts Section

For their sixth annual "Men Only" dinner, on Friday, March 6, the Beds & Herts section chose the Wilbury Hotel, Letchworth. Once again the function proved very enjoyable, and the hall was packed to capacity, late applications for places having been refused. Mr. L. A. S. Harbourne acted as toastmaster, and the first toast to "The Visitors" was proposed by Mr. A. F. Hammond, who mentioned particularly the chief guest, Mr. Ð. E. B. Barnard, the London branch president, who had travelled from Thorpe Bay to be present that evening. He also gave a list of other prominent persons amongst the guests, including a number of senior executives of local foundry firms, who, he said, were always ready to offer accommodation to the section for its meetings. Finally, he welcomed Mr. A. W. G. Bagshawe, from Dunstable, who was with them that evening. Mr. Frank Rowe responded to this toast, which was followed by that to the "Beds & Herts Section," proposed by Mr. W. T. Hobkirk. Mr. Barnard replied and, during his response, he was deputed to present two past-presidents' badges, the recipients being Mr. E. Daybell and Mr. A. F. Hammond (for special services to the section before and during their terms of office).

During the proceedings, Mr. Hobkirk took the opportunity to present a presidential badge of office and ribbon to the section for use on formal occasions. He made this donation as a memorial to his father, Mr. John Hobkirk, who died five years ago, and who had always been active in fostering co-operation amongst foundrymen. Before enlarging upon Mr. Hobkirk senior's career, he read a letter from the late Sir Richard Allen, dated May, 1902, which had offered his father employment, and which provided interesting sidelights on employment conditions of the period. It was after his father had retired from W. H. Allen's that he and his son had started Hobkirk's foundry in Bedford.

The evening's entertainment was provided by the "banter" of Bert Bradshawe, the singing of Joan Sheringham, and the piano and accordion playing of Frank Goldup.

Company News

BARROW HAEMATITE COMPANY, LIMITED—The acquisition by Close Bros. of over 90 per cent. of the company's ordinary shares, announced in our last issue, was on behalf of Arusha Industries, Limited, and is a preliminary to further acquisitions, it is stated.

HENRY BALFOUR & COMPANY, LIMITED, gas and chemical engineers, ironfounders, of Leven (Fifeshire)—A final dividend of 10½ per cent. makes 17 per cent. (16½ per cent.) for the year ended October 31, 1958. Group gross profit is £136,763 (£102,989) and the net profit £75,013 (£47,739).

BRUCE PEEBLES & COMPANY, LIMITED, manufacturing electrical engineers, of Edinburgh—Ordinary dividend is 30 per cent. (25 per cent. and 5 per cent. bonus) for 1958, and, on the preference shares, 7½ per cent. and a further 2½ per cent. contingent on profits. After taxation, profits amounted to £226,305 (£267,168). A two-for-one capitalization issue and subdivision of the £1 ordinary shares in 10s. units was announced last month.

ASQUITH MACHINE TOOL CORPORATION, LIMITED—Group trading profits increased to £815,105 (£699,569) in the year ended September 30, 1958, but shareholders are warned that such high profits are not to be expected for the current year. The chairman, Mr. Robert W. Asquith, believes that, subject to the usual proviso, there will be no difficulty in maintaining the 30 per cent. dividend (same), but on a capital raised by a one-for-two rights issue.

KITCHEN & WADE, LIMITED, makers of drilling, boring, and honing machines, of Halifax—Acceptances of the offer of the Asquith Machine Tool Corporation to acquire the 2,475,000 issued ordinary shares have been received in respect of more than 90 per cent. of such shares. The Asquith Machine Tool Corporation intends in due course to acquire any outstanding balance of the Kitchen & Wade shares compulsorily, but in the meantime has extended its offer until further notice.

INTERNATIONAL COMBUSTION (HOLDINGS), LIMITED—Results for the current year should not differ materially from those for the year to September 30, 1958, when it was announced that group net profits expanded to £1,375,292 (£1,274,745). The dividend is maintained at 25 per cent., but is supplemented by a special 5 per cent. interim in order to avoid additional profits tax liability. Value of orders at the end of the last financial year showed a substantial increase and current output is being satisfactorily maintained.

BTR INDUSTRIES, LIMITED, manufacturers of rubber belting, etc., of London, S.W.1—Group trading profits contracted by some 30 per cent. to £1,003,052 in the year to September 30, 1958, and reorganization, research, and development expenses increased considerably. The chairman, Sir Graham Hayman, states that as the causes of the disappointing results of the past year are still operative it is impossible to anticipate with any certainty a marked improvement in the current year. The dividend is maintained at 15 per cent.

NOBLE & LUND, LIMITED, engineers and machine-tool makers, of Felling-on-Tyne—There has been a slowing down in the demand for new machine tools and the value of outstanding orders is not now as high as a year ago, but Mr. H. Noble, chairman, reports signs of an improvement which, it is hoped, will continue now that credit restrictions have been relaxed. The level of production was maintained during 1958, turnover was a little higher, and profit, before tax, rose to £141,810 from £133,428. The 11 per cent. dividend represents an effective increase of 1 per cent.

METAL INDUSTRIES, LIMITED—The chairman (Mr. J. H. Rawlings) of Avo, Limited, manufacturers of coil winding machines, etc., in a circular to shareholders about the offer for the ordinary shares made by Metal Industries, says that the directors consider that acceptance of the offer is in the best interests of the shareholders. They will accept the offer in respect of their own shareholdings, which represent more than 60 per cent. of the issued capital. The terms are 10s. in cash for each 2s. ordinary share in Avo or one new Metal Industries ordinary share for every four Avo shares. Closing date is March 20.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s.)

803,683. R. W. Taccone, 28, Chautauqua Boulevard, Erie, Penns., USA.

Moulding machines, more particularly those utilizing a flexible diaphragm to perform the moulding operation. (This is an improvement of the invention described previously in B.P. 750,979, FOUNDRY TRADE JOURNAL, August 9, 1956.)

803,854. J. S. Nelson, 249, Hertel Avenue, Buffalo, NY, USA.

A permanent mould for making cast stud link chain, known as anchor chain, of aluminium or bronze. The link in such a chain consists of the usual ring connected by a transverse stud, so as to provide a link with two openings, or eyes, through which the curved ends of the adjacent links in the chain pass.

803,909. General Motors Corporation, Grand Boulevard, Detroit, Michigan, USA.

Reinforcing of shell moulds by backing material, so that support is provided for the mould during casting.

804,654. A. Razdow, 158, Montclair Avenue, Monclair, Essex, New Jersey, USA.

Apparatus for, and method of, inspecting members or mechanical parts in general, and the cross-section of such parts, such as blades and vanes of compressors or turbines in particular. (See also B.P. 786,213, FOUNDRY TRADE JOURNAL, February 20, 1958.)

804,718. Babcock and Wilcox Company, 161, East 42nd Street, New York, 17, NY, USA.

A process and apparatus for the continuous casting metals of high-melting-point, such as ferrous metals and alloys, in semi-finished products of various cross-sections.

804,867. A. Thyssen-Hutte, A.G., Duisburg, Hamborn, Germany, and Dortmund-Horder Huttenunion A.G., Dortmund, Germany.

Process of, and apparatus for, casting of metal bars in chill moulds. (See also B.P. 725,829.) The casting is shortened by compression during pouring to the tubular member, which is formed of partly-solidified metal in contact with the walls of the mould, and after pouring to the casting as a whole. The previous process had the disadvantage of the forming of transverse surface cracks after pouring and, in the casting of long bars, also during the pouring. It is hoped that the new invention will overcome this difficulty.

Electrical Engineers' Exhibition

The Electrical Engineers' (A.S.E.E.) Exhibition is to be held next week from March 17 to 21. Amongst the stands having exhibits of interest to foundrymen are the following:—

SYNCHRONOME COMPANY, LIMITED, of Middlesex, are the makers of a large turret clock, claimed to be the largest electrically-operated clock in the world, which will be suspended from the ceiling of the main hall. The clock dial has a dia. of 60 ft., and the minute hand measures 30 ft. from centre to tip. The tip of this hand travels just over 18 in. each half-minute, which means that it will travel approximately 3¾ miles during the exhibition. The movement of this giant clock is electrically wound once every hour, the total current consumption required being less than one third of a unit per day.

METROPOLITAN-VICKERS ELECTRICAL COMPANY, LIMITED, of Manchester (*Stand A.2*), will exhibit, amongst other equipment, a large range of squirrel-cage motors; tubular sheathed industrial heating-elements; radiant space heaters; control equipment; switchboard and control-board pattern-indicating instruments, and a cage speed recorder. The Metrovick 3-kw. radiant space-heater will be of particular interest. Its infra-red rays do not heat the intervening air, and it is therefore particularly suitable for exposed situations, such as shop porticos where other forms of heating would be either ineffective or too expensive.

ELECTRICAL DEVELOPMENT ASSOCIATION (*Stand B.5*) will mainly illustrate the advantages to industry arising from the greater use of electronic control, and the introduction of automation. Examples of automatic equipment which will be seen working will include an electronically-controlled conveyor, and a model of a driverless electrically-powered works truck which follows a pre-determined route. The conveyor will be of the type which selects various items and unloads them at pre-determined points in the factory. Operating through a punched tape, it will incorporate an electronic weigher. The truck, which will be powered by its own self-contained batteries, will be directed along a set route by signals from a radio frequency oscillator picked up from a metallic tape laid on the floor. The route can be quickly altered by removing and relaying the tape.

LANCASHIRE DYNAMO GROUP will be exhibiting on three stands: main display will be on *Stand E.6* and the other displays on *Stand T.1*, and J. G. Slatter & Company, Limited, on *Stand M.3*.

All companies will display selected products from the wide range which they manufacture. In addition, a number of items will be shown for the first time.

Amongst the exhibits will be a wide range of Pony motors; a 250-kw. silicon-rectifier equipment; a 30-h.p. Varimag magnetic amplifier variable-speed drive, and a motor-starter switchboard. On *Stand T.1* representative examples from a wide range of electronic industrial equipment will be shown, laying particular emphasis on a comprehensive range of adjustable-speed drives.

KLOCKNER MOELLER (ENGLAND), LIMITED (*Stand W.7*) will be displaying part of their range of wall- and floor-mounted control cubicles—in plastic and sheet metal. These moulded unit switchboards have busbar ratings of up to 600 amps. An interesting feature of the cubicles is the transparent fronts which make "walk-by" inspection possible.

BROOK MOTORS, LIMITED (*Stand K.16*). A new flameproof fan-cooled motor will be the chief exhibit on this stand. Also on show will be fan-cooled motors to British Standard 2083:1954, and a range of starters and fractional horse-power motors.

PHILIPS ELECTRICAL, LIMITED (*Stand N.79*) will show, amongst other things, infra-red heating equipment; a fluorescent inspection handlamp; a high-intensity narrow-beam spotlight; polyester ballasts, and rotor-type lampholders.

BRITISH INSULATED CALLENDER'S CABLES, LIMITED (*Stand F.9*), will show a large and varied range of paper-insulated cables for transmission and distribution of electrical power (including low-, medium- and high-voltage cables). Also on show will be many cable accessories, including joints, glands and terminal boxes for all types, including cranes and conveyors.

CIBA (A.R.L.), LIMITED (*Stand T.8*), will demonstrate the many uses of epoxy resins, *e.g.* for manufacturing high-voltage insulators and bushings; for impregnating and potting transformers of all sizes, and for glass-cloth laminates, protective coatings, and adhesives.

T. G. SCOTT & SON, LIMITED (*Stand W.3*), will mount a comprehensive display of Honeywell micro-switches and heating controls. The heating controls will include heavy-duty thermostats, which can directly control heaters using up to 4,000 watts; double-throw thermostats to control heating or cooling mechanisms, and systems of thermostats and combustion-control relays for the complete control of oil-heating systems.

Iron-ore Imports

The appended table shows the tonnage and value of imports of iron ore and concentrates (except chrome iron ore and wasted iron pyrites) in January, 1959, and gives figures for January, 1958. The figures for 1959 are not completely comparable with those for 1958.

From	Month ended January 31.		Month ended January 31.	
	1958.	1959.	1958.	1959.
	Tons.	Tons.	£	£
Sierra Leone	69,185	63,250	346,999	276,270
Canada	75,945	51,075	366,100	217,694
Other Commonwealth countries and Eire	—	1,202	—	4,944
Sweden	377,914	267,223	2,534,316	1,709,872
Norway	25,886	25,822	155,490	144,839
France	36,307	26,652	152,680	111,139
Portugal	12,901	14,430	65,723	59,464
Spain	76,651	37,578	396,039	192,004
Algeria	132,916	174,075	767,706	983,227
French West Africa	40,325	14,724	157,549	55,537
Tunisia	80,402	83,229	447,852	469,214
Morocco (excl. Tangier)	32,580	45,426	147,623	235,331
Liberia	21,220	33,100	130,184	191,541
Venezuela	221,663	122,808	1,331,523	720,321
Brazil	52,367	55,782	407,770	420,276
Other foreign countries	19,853	—	75,683	—
TOTAL	1,276,115	1,016,376	7,483,237	5,791,673

Mr. B. EICHLER has been appointed to the board of General Refractories, Limited, Sheffield. Mr. Eichler, who joined the company in 1940, was for several years chief technologist, and for the last four years has occupied the position of director of research.

ISI Translations

From amongst the most recently published lists of translations available from the Iron & Steel Institute (4, Grosvenor Gardens, London, S.W.1), the following have been selected as being of interest to founders. The price quoted is that for single copies, postage extra, there being reductions for quantities ordered. Readers writing for translations, or for further information, should mention this JOURNAL when doing so.

1132 ZINOV'EV, N. V.: Modern Hot-blast Cupolas for Steel-melting Plant. *Stal*, 1958, Sept., pp. 796-799. (£3 5s.)

1195 MELDAU, R.: Wetting Agents in Dust Techniques with Special Regard to the Wetting of Finely-divided Iron Oxides in Steelworks Smoke. *Arch. Eisenhüt.*, 1957, Oct., pp. 615-621. (£4 5s.) (Abstracted JISI, 1958, May, p. 79b: A general survey of the use of wetting agents in dust control is presented. The physics of wetting, the properties of wetting agents, the effect of particle shape on wettability, and the part played by iron oxide in this context are discussed. The feasibility of wetting brown smoke with a large variety of wetting agents is discussed in detail. Means of consolidating slurries and spoil heaps, and the use of a combination of several methods of operation to reclaim iron oxides in a pure form are briefly mentioned.)

Translations in course of preparation include:

1202 WRZESINSKA, E.: Determination of Nitride of Aluminium, Silicon, Vanadium and Chromium in Carbon Steels and Low-alloy Steels. *Prace Instytutow Hutnicdzch*, 1958, (3), pp. 180-183. (Included in response to requests received—List B 25.)

1243 POLASEK, J., and E. ZELINKA: Planning of Works Transport in the Metal Industry. *Hutnické Listy*, 1958, July, pp. 626-631.

1244 SKUIN, K.: Use of Radio-active Isotopes for the Determination of the Origin of Non-metallic Inclusions in Steel. *Technik* (Berlin), 1958, July, pp. 489-492.

Other Translations

The initials ASLIB etc. stand for the organization to which enquiries for translations should be made, quoting the reference numbers—addresses are quoted at the end of this item.

ASLIB: GB-43. ADLER, I.: New Measuring Instrument for Determining the Depth of Penetration of Cracks in Metallic Materials. *Deut. Werft*, 1954, **14**, No. 8.

OTS: PB 141 279T. AFANAS'YEV, S. G.: Converter Steel-production Development. *Stal*, 1957, No. 11, pp. 982-987.

ASLIB: GB-45. DION, G. H., and USQUELIS, R.: Electronic Methods of Rapid, Non-destructive Testing of Metals. *Ing. et tech.*, 1955, No. 83, Dec.

ASLIB: GB-4. ENGEL, J. and HEIDKAMP, G.: Temperature Relation of the Cone-indentation Hardness of Metals. *Z. Physik*, 1935, **95**, pp. 39-41.

NRC: C-2403. FISCHER, F.: Influence of Rate of Loading on the Stress-strain Diagram during Tension Tests. *Metall*, 1956, **10**, Nos. 9-10, pp. 419-423.

LC: 59-12144. KULIKOV, I. S. and POPOV, I. A.: The Use of Radioactive-isotopes in Metallurgy. *Primenenive Radioaktivnykh Izotopov v. Metallurgiy*, 1958. (Trans. of a book published by the State Scientific and Tech. Publ. House for Literature on Ferrous and Non-ferrous Metallurgy, Moscow, 1956.)

CSIRO: 3851. REPARTZ, F.: Correlation between Machinability and Other Properties of Materials. *Stahl u. Eisen*, 1953, No. 18, pp. 1169-1174.

DSIR: CTS 568. STRUKOV, A. N.: Influence of the Properties of Coke on the Melting Process of Cast Iron in Cupola Furnace. *Liteinoe Proizvodstvo*, 1957, No. 5, pp. 17-20.

Symbols for Sources of Translations:

ASLIB: Association of Special Libraries and Information Bureau, 4, Palace Gate, London, W.8, England.
CSIRO: Commonwealth Scientific and Industrial Research Organization, Information Service, 314, Albert Street, East Melbourne C. 2, Victoria, Australia.
LC: Photoduplication Service, Library of Congress, Washington 25, D.C.
DSIR: 5-11, Regent Street, London, S.W.1.
NRC: National Research Council, Library, Ottowa 2, Canada.
OTS: Office of Technical Services, Department of Commerce, Washington 25, D.C.

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Personal

Mr. R. F. HUNT, a director of the Dowty group, has been appointed deputy chairman.

Mr. W. R. BESWICK has retired from the board of the Power-Gas Corporation, Limited.

Mr. CHARLES F. PRATT has been appointed a director of Charrington & Company, Limited, to succeed the late Mr. H. Davenport Price.

Mr. LAURENCE MALEC has joined the Solartron Electronic Group, Limited, as managing director of Solartron Radar Simulators, Limited.

Mancuna Engineering, Limited, of Denton, Manchester, announce the appointment of Mr. R. A. LE PAGE, M.A., as managing director.

It is reported that Mr. J. F. CHAMBERS is no longer associated with, or a director of, High Wycombe Foundry Company, Limited, and Salt Hill Foundry, Limited.

Mr. K. C. MOLLOY, head of the gas-cleaning division, and Mr. J. DUNNING, works manager, have been appointed directors of the Sturtevant Engineering Company, Limited.

Mr. WILLIAM A. WOODCOCK has been appointed vice-president and general sales manager, chemicals and plastics, of the Union Carbide International Company, Limited, a division of the Union Carbide Corporation of the US.

The Society Medal of the Society of Chemical Industry, which is awarded not more than once every two years for conspicuous services to applied chemistry or to the Society, has been awarded for 1959 to Dr. FRANCIS H. CARR, C.B.E.

Mr. R. L. THOMAS has been appointed general manager of British Brown-Boveri, Limited, electrical and mechanical engineers and contractors, of London, S.W.1. Mr. R. H. COATES, manager of the electrical section, will act as his deputy.

VISCOUNT WEIR has been re-elected honorary president of the British Employers' Confederation. Sir WILLIAM GARRETT has been re-elected president and LORD MCCORQUODALE OF NEWTON and Mr. E. J. HUNTER are again vice-presidents.

Sir ALEXANDER FLECK, chairman of Imperial Chemical Industries, Limited, has accepted the presidency of the Industrial Co-partnership Association. He succeeds Viscount Cecil of Chelwood, who was president from 1919 until his death last November.

Mr. C. G. PETTIT, assistant managing director of the Incandescent Heat Company, Limited, Smethwick, has accepted an invitation to become president of the West Bromwich, Smethwick and District Manufacturers' Association. He will take office in April.

Dr. W. I. PUMPHREY, manager of the research department of Murex Welding Process, Limited, Waltham Cross, Herts, has been elected to the Court of Governors of the University of Birmingham as a representative of the Guild of Graduates.

Mr. JOHN L. YOUNG has been appointed managing director of Minworth Metals, Limited, and of its subsidiary, Britannic Alloys, Limited. He succeeds Mr. ROBERT HISCOCK who has retired as managing director but remains as director of both companies.

G. & J. Weir Holdings, Limited, announce the following appointments to the board of directors: Mr. IAIN M. STEWART, B.SC., chairman and managing director of Thermotank, Limited, and Mr. JOHN H. LORD, C.A., a director of Dunlop Rubber Company, Limited.

Mr. B. T. DYETT, financial director of R. B. Pullin & Company, Limited, scientific-instrument manufacturers, Phoenix Works, Brentford, has been presented by the managing director, Mr. P. J. Ellis, O.B.E., with a gold watch on completing 21 years' with the firm.

Mr. ROBERT W. ASQUITH, chairman and managing director of William Asquith, Limited, machine-tool makers, Halifax, Yorkshire, and chairman and joint managing director of Modern Foundries, Limited, Halifax, has returned home after a three-week tour of Peking.

Mr. T. F. HURLEY, who recently retired from the position of chief research engineer at the Fuel Research Station, has joined the National Industrial Fuel Efficiency Service. He is best known for his work on pulverized fuel and the measurement and prevention of smoke from industrial boilers.

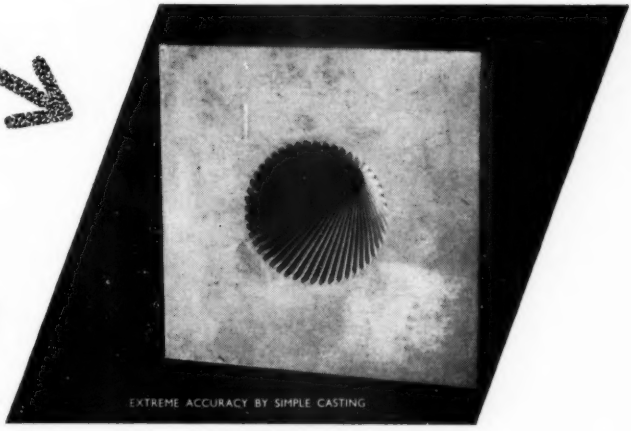
Commander IAN STEELE, public relations officer at the Appleby-Frodingham steelworks at Scunthorpe for the past four years, has been appointed company welfare officer to the United Steel Companies, Limited, Sheffield. He is secretary of the Lincolnshire Iron and Steel Institute, and also chairman of the Scunthorpe Playgoers' Society.

Alderman A. V. WOLSTENHOLME, a representative of Thos. Firth & John Brown, Limited, steel manufacturers, Atlas Works, Sheffield, has been nominated by the Conservative-Liberal group on Sheffield City Council as the next Lord Mayor of Sheffield. He is 57 years old and has been on the Council for 20 years, becoming an alderman in 1955.

Mr. J. W. SMITH, assistant drawing-office manager with George Fletcher & Company, Limited, Masson Works, Derby, has retired after 52 years' service with the company. On behalf of the office and works staff Mr. C. W. Murray, chairman and managing director, presented Mr. Smith with a number of gifts as a memento of the occasion.

The Constructional Engineering Company, Limited, announce changes in the constitution of the board of directors consequent upon the death of Mr. D. H. WOOD. Mr. FREDERICK H. HOULT has been appointed managing director; Mr. J. H. GRAINGER, executive director and general manager, and Mr. J. E. WIGLEY, executive director and secretary. Mr. Hoult is a well-known foundryman having had experience as the chief executive in both iron and light-alloy concerns.

Dudley (Worcs) Town Council recently conferred the Freedom of the Borough on Mr. C. E. LLOYD (82) and Ald. J. H. MOLYNEAUX (76), both of whom started their careers as apprentice patternmakers at Rugby. Mr. Lloyd developed wide industrial and commercial interests and has been chairman and director of a large number of companies. He retired from the chairmanship of N. Hingley & Sons, Limited, dropforgers, makers of wrought iron and steel bars, etc., of Dudley, in January. He remains a member of the board and is also a director of F. H. Lloyd & Company, Limited, John Bradley & Company (Stourbridge), Limited, and Lloyds British Testing Company, Limited. He was Unionist MP for Dudley, 1922-29, and 1941-45. He served as president of the National Federation of Iron and Steel Manufacturers in 1925 and was High Sheriff of Worcestershire in 1935. Ald. Molyneaux remained a patternmaker throughout his career until his retirement a few years ago. His absorbing interest has been in local government and he has the distinction of having been Dudley's first Labour councillor, alderman and mayor, and has been mayor of Dudley four times.



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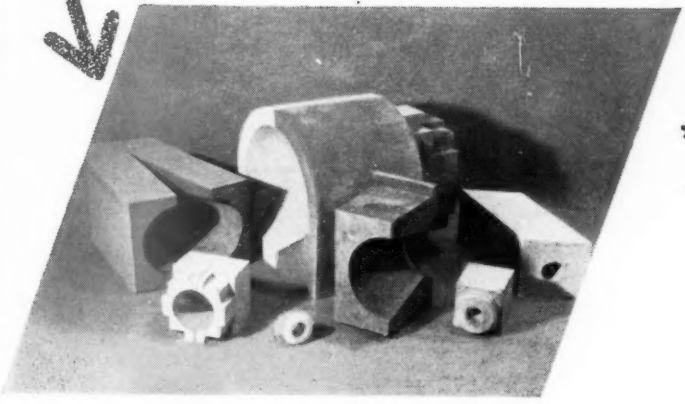

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AP/77

News in Brief

J. STONE & COMPANY (CHARLTON), LIMITED, is planning to erect extensions to the foundry at Woolwich Road, Charlton, London, S.E.7.

BELIEVED TO BE THE BIGGEST CARGO of its kind to leave the Tyne is the 4,300 tons of iron and steel scrap loaded at the Albert Edward Dock, North Shields, in the Norwegian Motor Vessel, Marie Bakke, which left for Japan on March 3.

ALFRED ELLISON, LIMITED, announce the appointment of Mr. J. M. M. Winkelman as sales and technical representative for grey-iron castings in London and the Home Counties. Mr. Winkelman will operate from Ellison House, 11, Connaught Place, London, W.C.2.

CAMPAIGN TO ATTRACT trade and industry to Scotland is being conducted for three weeks in the United States and Canada by the Scottish Council (Development and Industry). Council representatives have planned further missions to Scandinavia and other parts of Europe to explore trade opportunities.

A NEW TWO-STOREY FACTORY built by the Firth Company, Limited, Warrington, to replace an old mill destroyed by fire in December, 1957, is now ready for occupation. The company will now be enabled to increase production of its existing range of wire products, and to enter new markets.

Mr. D. H. ARMITAGE, managing director of P. I. Castings (Altrincham), Limited, addressed the Sheffield and district branch of the Institute of British Foundrymen at the Sheffield College of Commerce and Technology, on March 2, on "Modern Investment Castings." He described the use of wax moulds for casting complex metal shapes.

THE 1959 MAY LECTURE of the Institute of Metals will be delivered by Professor F. Hoyle, F.R.S., on "Scientific Uses of Space Exploration." The meeting will be held in the Lecture Theatre of the Royal Institution, Albemarle Street, London, W.1, on April 14, at 7 p.m. Visitors will be welcome and tickets of admission are not required.

AT THE FIRM'S request the Board of Trade has agreed to build a large extension to the factory leased to the Cummins Engine Company, Limited, at Shotts (Lanarkshire). The extension should provide employment for about 200 workers, in addition to the increase in the labour force of about 100 which it is hoped to achieve within the next two years.

PRESSED STEEL COMPANY, LIMITED, Cowley, Oxford, are building a new factory in Swansea, the cornerstone of which was laid last week by Mr. John Rogers, M.P., Parliamentary Secretary, Board of Trade. The company is to manufacture household equipment under licence from the Whirlpool Corporation of America, which includes such items as home laundries.

IN CONNECTION with its Strathfarrar/Kilmorack hydro-electric scheme near Beauly in Inverness-shire, the North of Scotland Hydro-Electric Board has awarded contracts worth nearly £4,500,000 to the Mitchell Construction Company, Limited, of Peterborough. The work involves the construction of the Deanie Tunnel; the Monar Dam and the Culligran tunnel and power-station.

CRAVENS, LIMITED, rolling-stock manufacturers, Darnall, Sheffield, have received a contract from London Transport for the design and construction of 248 cars for the Metropolitan Line. Delivery is to start in the second half of next year and be completed by the end of 1961. Over five tons weight per car will be saved by the use of aluminium panels and light-alloy under-frames and body parts.

YESTERDAY, when delegates representing member firms of the National and Midland Ironfounders Association were assembled at the Queen's Hotel, Birmingham, for their annual general meeting, they were addressed by Mr. H. Woods, H.M. Deputy Chief Inspector of Factories (and chairman of the Joint Standing Committee on Conditions in Ironfoundries), on "Health and Safety Problems in Iron Foundries."

NO FEWER THAN SEVEN heavy-duty road transport vehicles were needed to carry an initial consignment of rolls for the Durgapur steel plant, on their way to India from the works of Davy & United Roll Foundry, Limited, at Billingham, County Durham. (At Durgapur, 118 miles from Calcutta, Indian Steel Works Construction Company, Limited (Iscon)—a consortium of 13 British manufacturing and electrical companies—is building an integrated steelworks for the Government of India.)

SAMUEL FOX & COMPANY, LIMITED, Stocksbridge, Sheffield, are now providing straight-chromium stainless steel to four firms for the manufacture of domestic-cooking utensils. Aluminium has previously been mainly used for these because of the difference in price and the shortage of stainless steel up to a year ago. It has now been found possible by the use of the stainless steel, previously used almost entirely for motor-car trim, to put the holloware on the market at a lower price.

A NEW £1,000,000 HEAVY-ENGINEERING SHOP, where components are made for nuclear power-stations, was shown to Mr. Hugh Gaitskell, leader of the Parliamentary Labour Party, when he visited the works of International Combustion, Limited, Sinfin Lane, Derby, on Saturday. He saw the shell of a heat-exchanger which is being made for the Windscale power-station and was told that it was the first of its type to be made in this country and one of the first in the world. He also spoke to some of the 300 employees on the Saturday-afternoon shift. Mr. Gaitskell was welcomed by the managing director of International Combustion, Mr. J. Mayer, and a director, Mr. R. T. Burleigh.

Obituary

The death occurred on March 3, at the age of 60, of Mr. T. H. TURNER, secretary of British Northrop, Limited, Blackburn, for nearly 20 years.

The death on March 1 (in his 83rd year) is announced of Mr. THOMAS PLATT who, before his retirement, was chairman of Thomas Platt & Sons (Widnes), Limited. Mr. Platt joined the Institute of British Foundrymen in 1933.

The death is announced of Mr. ERIC HERBERT Salinger at the age of 73. Prior the 1939-45 war, he was the owner of a large machine-tool foundry in Berlin—a business which had been started by his father—and before he left Germany, he took a very prominent part in the foundry employers' association as chairman of its costing committee. The publication *Harzbinger Drucksach*—a foundry costing manual—was largely his work. After he came to this country, he joined the Institute of British Foundrymen in 1939, and quickly became an enthusiastic member, always participating in its annual and associated international congresses. Shortly after the war, he became a naturalized British subject. Mr. Salinger had a charming personality and had a wide circle of friends in the foundry industry. His death took place on arrival at Monte Carlo, where he was hoping to recuperate following a recent illness.

Cutting costs in the foundry

Versatile Yale trucks save labour, cut production time, prevent damage

In British foundries, Yale trucks help to avoid unnecessary handling, free men for more productive work, cut production time and costs. Here are three examples of Yale *planned handling* at work:

PREVENTING DAMAGE...

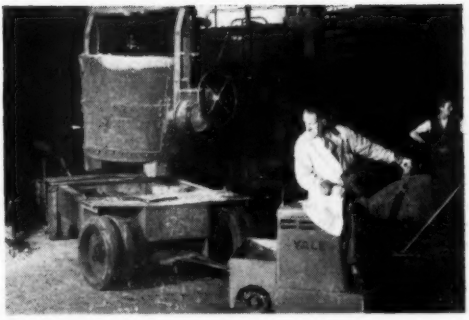
The versatile Yale Series 51 truck is used in all foundry departments by K & L Steel Founders & Engineers Ltd. of Letchworth. It is seen here transporting 12 carbon electrodes weighing some 3,900 lbs from the foundry stores to the steel melting shop. By placing these brittle electrodes on stillages, and moving them with the Series 51 truck, damage has been virtually eliminated.

Yale Series 51 electric trucks are available in capacities from 3,000 lbs to 10,000 lbs.

SAVING LABOUR...

This Yale Worksaver saves time and labour at the Leeds foundry of Catton & Co. Ltd. Here it is seen loading a full ladle on to a bogie for movement to the moulding shops. The 10-ton bogie is pulled by the Worksaver, driven by the ladle man. Drivers of trucks previously used to haul the ladle have been released for more productive work in the foundry. The Worksaver also helps to speed deliveries of steel to all moulding shops.

Yale Worksavers are available in Platform and Pallet Models (2 or 3 tons); Fork Lift (1,500, 2,000, 2,500, 3,000 lbs); Tractor (700 lbs draw-bar pull).



...SAVING TIME AND COSTS

At the Holfos foundry of John Holroyd & Co. Ltd., the old practice of searching through a pile of heavy chills to find the right one for a particular job was dispensed with by building a special store. Although this store is only 85' by 25' in area, it accommodates some 5,000 chills. Chills are housed in 370 compartments, on 5-tiered racks. Each is easily identified, and is moved on a pallet by a Yale Warehouser fork truck, which can work in aisles only 6 feet wide. Heavy manhandling no longer adds to time and production costs.

Yale Warehousers are available in Platform Models (2 tons); Fork Lift Models (2,000 and 3,000 lbs).

The Yale range includes power trucks for every lifting and moving need up to 200,000 lbs; Hand Trucks for loads up to 12,000 lbs; Hoists for lifting up to 40 tons (trolleys to suit all models); Pul-Lifts in capacities from ½ to 15 tons.

YALE
REGISTERED TRADE MARK

The world's largest range of materials handling equipment

THE YALE ADVISORY SERVICE *For free advice on your own handling matters, write to:*

The YALE & TOWNE Manufacturing Company, Materials Handling Division, Dept. FT3, Wednesfield, Staffs. Tel: Willenhall 941.

International Harvester's Record Year

Yet another record year, with increased sales and profits, is reported by the International Harvester Company of Great Britain, Limited. Domestic sales increased in almost every product line, more than balancing a downturn in exports. Total volume attained was £17,778,561. After a record first half year, exports dropped to 5.5 per cent. below the 1957 level in the second half of the year.

In the home market, sales of wheeled tractors and farm equipment rose by over 7 per cent. and construction equipment by over 21 per cent.; total domestic sales increased by 15.6 per cent. over 1957.

The company's manufacturing and engineering organization had proved its ability to design and manufacture to meet competition in prices and quality in the world market, states the managing director, Mr. O. G. Voss. Although it was difficult to generalize about the future in an industry that depended to a great degree on its exports, he believed the company could look forward to even better results in 1959.

The parent company, International Harvester Company of Chicago, shows domestic-sales volume at $1,098,390,000, a decrease of 7.4 per cent., but on a world-wide basis, the decrease stands at only 6 per cent., with a smaller proportional decrease in profits.

Fewer Stoppages of Work in January

According to a survey taken at the end of May, 1958, by the Ministry of Labour, there was an increase in the number of employees in the engineering, shipbuilding, and electrical goods industries, and the chemical and allied trades. Almost all other industries, especially mining, lost employees in the 1957-58 period.

Numbers involved in stoppages of work in January was about 35,300 and the aggregate time lost was 84,000 working days. In all 174 stoppages began during the month, compared with 284 in January, 1958.

A comparative table of average weekly earnings and hours worked last October and a year previous show a slight rise in earnings with the exception of metal manufacture. Earnings and hours, with 1957 figures in parentheses, were as follow:—Metal manufacture, £13 1s. 11d., 45.7 (£13 7s. 7d., 47.3); vehicles, £12 11s. 4d., 45.4 (£12 8s. 7d., 46.2); engineering, shipbuilding, electrical, £11 13s. 9d., 46.4 (£11 10s. 10d., 47.0); overall average, £10 17s. 4d., 46.0 (£10 12s. 5d., 46.4).

Rise in Gearbox Orders for David Brown

Recent measures taken by the automobile gearbox division of David Brown Industries, Limited, Huddersfield, to reorganize production facilities and extend its range of products are reflected in the current order position.

Delivery schedule for the first quarter of 1959 shows a considerable increase over the corresponding period last year and current orders, both for gearboxes for heavy duty vehicles and light duty vehicles, are almost double those in hand a year ago. Orders for gearboxes for medium capacity vehicles, however, are four times as numerous as a year ago.

British Oxygen Turnover Expands

Underactivity just now in many spheres of heavy industry and general engineering is reacting on the UK industrial-gas business of the British Oxygen Company, Limited, but sales and profits overseas are on the upgrade, states the chairman, Mr. J. S. Hutchison. Profits this year are expected to bear favourable comparison with those for the year to September 30, 1958.

Group turnover in 1957-58 rose by 15.7 per cent., and the net profit advanced to £3,334,062 (£2,748,986). The dividend is maintained at 10 per cent. and a special interim of 2 per cent. is declared in respect of the current year. The group capital expenditure programme for the three years 1958 to 1961 at present totals £24,000,000. This is expected to come from company's resources without issue of further capital. Year-end commitments amounted to £2,850,000.

Although there is as yet no indication of a resumption of the upward trend in the UK gases division, recent inquiries show a distinct revival of interest in the electric welding division. Sales and profits of the chemical division are not expected to reach last year's levels and future advance may slow down.

Law Case

Accidents Should be Recorded

A plea of guilty was entered recently by a foundry firm to six summonses under the Factories Act 1937. The offences related to failure to report three accidents to H.M. Inspector of Factories and failure to enter particulars of the accidents in the firm's general register. The offences were discovered when an inspection of the firm's premises was made. The spokesman for the defendant said the offences has arisen from the misunderstanding of an employee whose task it was to record accidents and the matter had been remedied for the future. A fine of £30, with £3 17s. 2d. expenses was imposed.

Yugoslav Contract for British Firms

Contract worth £3,700,000 to supply tractors, agricultural machinery, and parts to Yugoslavia has been won by Massey-Ferguson, Limited, and its new subsidiary, F. Perkins, Limited, Peterborough diesel engine manufacturers. This brings the total of export business received from Yugoslavia by the two companies since 1955 to over £14,500,000.

The contract provides for 5,000 tractors powered—as in previous contracts—by Perkins engines. Deliveries will begin at once and be completed within 12 months. Some 8,000 Massey-Ferguson tractors are already working in Yugoslavia out of a total of about 25,000, while more than 13,000 Perkins engines are in operation there.

In addition, F. Perkins has now received an order for 900 four-cylinder P.4 engine sets for the Yugoslav-built Zadrugar tractor.

WITHIN THE NEXT FEW WEEKS work providing employment for considerable numbers in the area will begin on the construction at a price of £1,000,000 of a dry dock by the Mercantile Dry Dock Company, Limited, Jarrow-on-Tyne. The dock, which will accommodate ships of up to 24,000 tons d.w., will be completed in 1961. Pumping equipment for the dock will be supplied by Drysdale & Company, Limited, Glasgow.

And . . . why not!

Frankly the purpose of this advertisement is to bring to your notice that our prices for non-ferrous ingots of the highest quality may well be a good deal cheaper than those you are already paying—and our deliveries are exceptionally good, too. Then why the setter with philosophical doubts? Well, we thought that at first sight you might be rather more interested in her than in us. But now we have come this far together, may we send you particulars of our production facilities and details of our very keen prices?

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Raw Material Markets

Iron and Steel

Pig-iron production is maintained and, although compared with a year ago the number of furnaces in operation is about 13 less and annual rate some 2,000,000 tons lower, supplies now available in all grades are more than sufficient to meet requirements. The chief decline in output and demand applies to basic pig-iron for the steelworks, whose requirements continue to be much below former levels. This has necessitated the closing down of some furnaces and a curtailment in outputs from others. In the event of bigger tonnages being required, however, producers could step up production considerably. This position also applies to high-phosphorus foundry pig-iron, the demand for which has been very moderate for some time. This iron is mainly used by the light, jobbing, and textile foundries, at all of which business is quiet.

The light foundries supplying castings to the domestic utensil trade are now doing better, but this improvement has not yet increased appreciably their demands for pig-iron, due mainly to a larger usage of scrap in their mixtures. Makers of low-phosphorus irons are comparatively in a better position than producers of other grades, as the demands from the engineering and speciality foundries enable them to dispose of a good proportion of their current makes. Most producers of pig-iron, however, have fairly appreciable stocks which present demands are insufficient to absorb, and their inability to clear at least a portion of their stocks is both uneconomical and costly.

High-duty castings are comparatively in biggest demand, and the foundries supplying these continue to be fairly well occupied. In addition to the low-phosphorus iron, they are taking up fair quantities of hematite and some refined irons, both of which are plentiful.

The demand for foundry scrap is active, and parcels arising of heavy cast-iron and machinery scrap are readily taken up. Exports of scrap have reduced available quantities in both steel and cast-iron scrap and many home users are anxious to obtain additional tonnages for stock. The free export of scrap terminated on Saturday. This measure should ease the supply of both cast-iron and steel scrap for home foundries. Foundry coke deliveries are satisfactory and ganister, limestone, and firebricks present no difficulties.

Business at the re-rollers shows no general improvement and many of the mills continue on short-time working. The call for small bars and light sections from home sources is disappointingly low and little export business can be obtained at UK prices, which are some pounds higher than those of overseas producers. There is a fairly good call for reinforcing rods, but only moderate demands for thin strip. Demands for steel semis are low and home steelworks have capacity available to increase considerably on present deliveries. Little stock is being carried by the re-rollers, and orders are being placed on day-to-day requirements.

Non-ferrous Metals

Copper has been a firm market on both sides of the Atlantic. This is particularly true in America where the custom smelters' price was advanced to 32 cents a pound, equivalent to £256 a ton. US producers on Monday raised their price by 1½ to 31½ cents a pound. Demand has been good, while the futures market is also firm and it will be interesting to see how much of current demand is for consumption and how much is for building up inventories. In any event, the strength of the American market has had a favourable impact on London, where cash metal has touched £250 a ton. The recent upward trend cannot, however, be wholly attributed to demand and the undertone is not as firm as one would like. This was apparent when the price dipped sharply following the news that the El Teniente strike had, in principle, been settled with the strikers returning to work. Nevertheless, activity is at a satisfactory level and is expected to remain so. The generally unsettled political state of the Rhodesian Federation is a bullish factor and this, plus the healthy state of the New York market, is more than offsetting the weekly increase in copper stocks in LME warehouses.

Tin has exhibited satisfactory strength in London, in New York, and in the East. The Eastern price, after being well over £800 a ton, dropped sharply on what can only be due to buffer stock selling of Straits metal, but the price moved up by £6 10s. on Tuesday. While it is desirable that the buffer stock manager unload as much metal as possible from stocks, the object of the exercise must continue to be the maintenance of a high price consistent with the progressive raising of the export quotas. It is reported from Singapore that the increase in the export quotas for the period beginning in April will enable a number of gravel pump mines to reopen, and it will also redound to the general advantage of business conditions. In the US the market has closely followed London and Singapore and the price is around $1.03 cents a pound.

Improvement in demand for lead in the United States has resulted in the price being raised ½ cent to 11½ cents a pound. It is doubtful whether the overall position justifies the increase. On the other hand, as demand is routine the offtake is not expected to decline at the higher level. In London the market took some encouragement from the US price rise and activity has been on a slightly better scale.

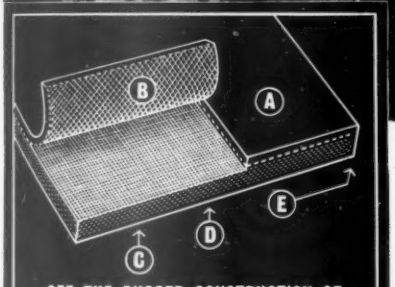
Zinc has been a good market both in London and in New York. In the United States demand is being affected favourably by the rapidly expanding steel production. Sales of cars in Detroit still seem to be sticky, but should this source also enter the market in strength the price must soon go to higher levels.

Latest Foundry Statistics

Light Alloys. Last year, this country made 81,099 tons of aluminium-alloy castings. Statistics issued by the Ministry of Supply give the following breakdown: 19,046 tons were made from sand moulds; 44,446 tons by the gravity-die method, and 17,607 tons by the pressure-die system. A similar analysis for last December shows 1,450, 3,753 and 1,608 tons as having been made by these processes. The 1958 production of magnesium castings is given as 1,826 tons, and of this 141 tons was made in December.

Mr. JOHN C. DUCKWORTH will become managing director of the National Research Development Corporation on April 1. Mr. Duckworth, who is 42, has had a scientific career which started with radar research and development during the war. He is at present chief research and development officer of the Central Electricity Generating Board. Mr. Duckworth succeeds the EARL OF HALSBURY, who will retire at the end of this month. Mr. DENNIS HENNESSEY has been appointed by the Corporation to a new post of deputy-managing director. He joined the staff in 1950 at the age of 38 and was made an executive member of the Corporation in 1956.

One of a series of Goodyear equipped conveyors at the South Bank Coke Ovens of Dorman Long (Steel) Ltd.



SEE THE RUGGED CONSTRUCTION OF GOODYEAR CONVEYOR BELTING

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- **C** Plies of close-woven rayon or cotton duck, mildew inhibited.
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WHATEVER YOU HAVE to convey—hot sinter or abrasive coke, wet ash or uncrushed stone — you'll find there's a tough Goodyear belt to give you more output at lowest cost per ton. Special features of these 'job-designed' belts include: correct troughing, high impact resistance and flex life, resistance to mildew. Many thousands of installations at steelworks, power stations, mines, quarries and factories have proved their endurance and reliability in the most exacting conditions — confirming that Goodyear Conveyor Belting is the wise choice when conditions are exacting.

GOODYEAR

INDUSTRIAL RUBBER PRODUCTS

CONVEYOR BELTING · V-BELTS · TRANSMISSION BELTING · HOSE

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

March 11, 1959

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £41 0s. 0d. to £43 10s. 0d., scale 15s. 0d. per unit; 75 per cent. Si, £56 10s. 0d. to £60 10s. 0d., scale 15s. 0d. to 16s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 7s. 11d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 10s. 11d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £77 0s. 0d. to £81 0s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; over 6 per cent. C, £74 10s. 0d. to £77 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; 2 per cent. C,* 1s. 7½d. to 1s. 10½d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 0.15 per cent. C,* 1s. 9d. to 2s. 0d. per lb. Cr; 0.10 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £255 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/72 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (home).—78 per cent., £69 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in. and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £67 10s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £250 0s. 0d. to £250 10s. 0d.; three months, £249 10s. 0d. to £249 15s. 0d.; settlement, £250 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 4¾d. per lb.; rods, 261s. 6d. per cwt. basis; 20 s.w.g., 296s. 6d. per cwt.

Tin.—Cash, £783 0s. 0d. to £783 10s. 0d.; three months, £787 0s. 0d. to £787 10s. 0d.; settlement, £783 10s. 0d.

Lead (Refined Pig).—First half March, £70 10s. 0d. to £70 15s. 0d.; first half June, £72 5s. 0d. to £72 10s. 0d.

Zinc.—First half March, £76 0s. 0d. to £76 2s. 6d.; first half June, £74 5s. 0d. to £74 7s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £110 17s. 6d.; rolled zinc (boiler plates), all English destinations, £108 12s. 6d.; zinc oxide (Red Seal), d/d buyers' premises, £95 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 11d. per lb.; sheets to 10 w.g., 205s. 0d. per cwt.; wire, 2s. 8¾d.; rolled metal, 205s. 0d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £159; B6 (85/15), £205.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £196; HTB2 (38 tons), £205; HTB3 (48 tons), —.

Gunmetal.—BS1400, LG2 (85/5/5/5), £200; LG3 (86/7/5/2), £206; G1 (88/10/2/½), £268; (88/10/2/1), £247.

Phosphor Bronze.—BS1400, PB1 (AID released), £295 per ton.

Leaded Phosphor Bronze.—BS1400, LPB1 (1060), £217 per ton.

Phosphor Bronze Strip, etc.—Strip, 299s. 9d. per cwt.; wire, 4s. 2½d. per lb.; rods, 3s. 5½d.; tubes, 3s. 5½d.; chill cast bars: solids 3s. 4¾d.; cored 3s. 5¾d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 10½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 3½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 2½d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 3d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £74 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £251; AB2, —.

* Average 68-70 per cent.

Increases in Capital

LION STAMPING COMPANY, LIMITED, London, E.15, increased by £50,000, in £1 ordinary shares, beyond the registered capital of £50,000.

BROOKS VENTILATION UNITS, LIMITED, London, W.1, increased by £23,000, in £1 ordinary shares, beyond the registered capital of £2,000.

MAURICE BUSHELL (WELDERS), LIMITED, Salford (Lancs), increased by £17,000, in £1 shares, beyond the registered capital of £3,000.

FRY'S METAL FOUNDRIES, LIMITED, London, S.E.19, increased by £440,000, in 10s. ordinary shares, beyond the registered capital of £160,000.

BURTON & DEAKIN, LIMITED, engineers, etc., of London, W.1, increased by £15,000, in £1 ordinary shares, beyond the registered capital of £20,000.

BROOKS AIR & HEAT SYSTEMS, LIMITED, London, W.C.2, increased by £20,000, in £1 ordinary shares, beyond the registered capital of £5,000.

STANDARD RAILWAY WAGON COMPANY, LIMITED, Manchester, increased by £25,000, in £1 ordinary shares, beyond the registered capital of £30,000.

KITSON'S INSULATIONS, LIMITED, boiler coverers, etc., of Barking (Essex), increased by £100,000, in 10s. ordinary shares, beyond the registered capital of £100,000.

STOTHERT & PITT, LIMITED, ironfounders and engineers, etc., of Bath, increased by £500,000, in £1 ordinary shares, beyond the registered capital of £2,000,000.

BURTON CONSTRUCTIONAL ENGINEERING COMPANY, LIMITED, Burton-on-Trent, increased by £70,000, in £1 shares, beyond the registered reduced capital of £130,000.

ROBERT JENKINS & COMPANY, LIMITED, electrical and mechanical engineers, etc., of Rotherham, increased by £370,000, in £1 ordinary shares, beyond the registered capital of £500,000.

REGON INDUSTRIES, LIMITED, art and general metal workers, etc., of Birmingham, increased by £11,000, in £1 redeemable preference shares, beyond the registered capital of £6,000.

ERNEST HOLMES, LIMITED, plant and machinery erectors, installers, etc., of Birmingham, increased by £10,000, in £1 preference shares, beyond the registered capital of £15,000.

BARBER-GREENE, OLDING & COMPANY, LIMITED, material handling machinery manufacturers, etc., of London, E.C.3, increased by £50,000, in £1 shares, beyond the registered capital of £100,000.

COLVERN, LIMITED, electrical and mechanical engineers, etc., of Romford, Essex, increased by £150,000, in £1 8 per cent. cumulative preference shares, beyond the registered capital of £250,000.

NEW EQUIPMENT, LIMITED, engineers and manufacturers of tubular products, etc., of Croxdale (Co. Durham), increased by £15,000, in £1 ordinary shares, beyond the registered capital of £10,000.

NEWEY & TAYLER, LIMITED, pin manufacturers, etc., of Birmingham, increased by £1,000,000, in 200,000 5 per cent. cumulative preference and 800,000 ordinary shares of £1 each, beyond the registered capital of £600,000.

WILLIAM ARNOLD & SON (HUDDERSFIELD), LIMITED, boilermakers and engineers, etc., of Huddersfield, increased by £12,000, in 6,000 preference and 6,000 ordinary shares of £1 each, beyond the registered capital of £3,000.

E. GREEN & SON, LIMITED, fuel economizer manufacturers, etc., of Wakefield, increased by £2,499,900, in 999,950 7 per cent. cumulative preference and 1,499,950 ordinary shares of £1 each, beyond the registered capital of £100.

INA NEEDLE BEARINGS, LIMITED, London, W.1, increased by £30,000, in 300 ordinary shares of £100 each, beyond the registered capital of £20,000. At November 21, 1958, Hydreth, A.G., of Switzerland, held a majority of the issued shares.

JAMES NEILL & COMPANY (STRIPS), LIMITED, Sheffield, increased by £131,900, in £1 ordinary shares, beyond the registered capital of £100. The above increase is for the purpose of the acquisition of the business and undertaking of James Neill & Company (Sheffield), Limited.

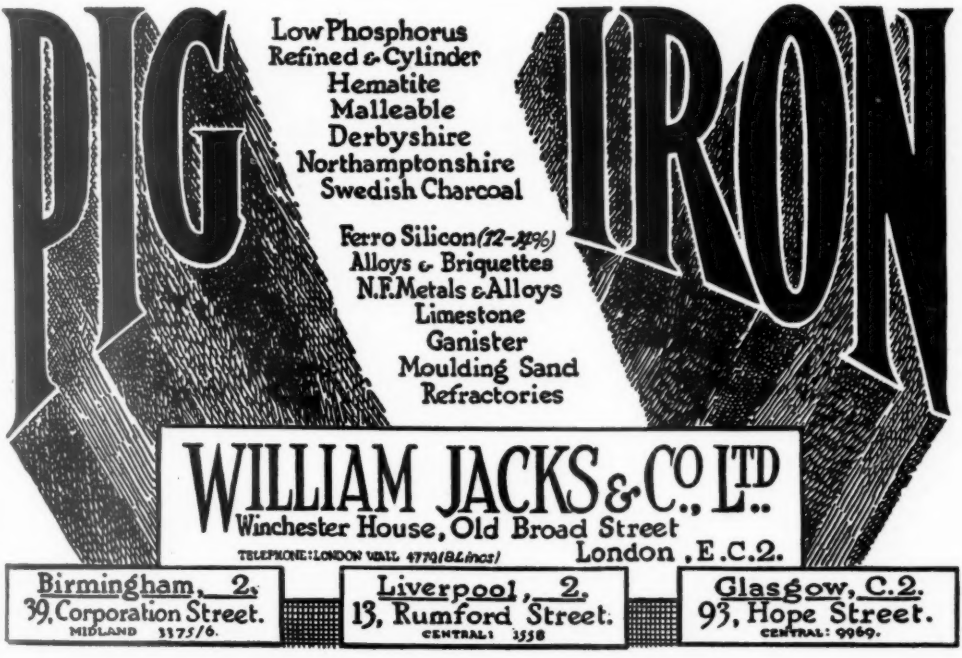
JOHN FOLKES GROUP, LIMITED (formerly John Folkes (Lye Forge), Limited), forgemasters and general engineers, etc., of Stourbridge, increased by £350,000, in 5,000,000 ordinary shares of 1s. and 100,000 unclassified shares of £1 each, beyond the registered capital of £250,000.

Recent Wills

PINNEGAR, W. E., of London, N.W.7, formerly a company director and for 50 years with John Thompson, Limited, manufacturers of boilers, economisers, etc., of Wolverhampton £13,382

CULLEN, A. F., of Cardiff, for many years a prominent figure in dock circles, former director and secretary of T. Beynon & Company, Limited, secretary of Aberthaw & Bristol Channel Portland Cement Company, Limited, and secretary of Fernhill Collieries, Limited £30,933

WILES, G. A., shipyard manager of Swan, Hunter, & Wigham Richardson, Limited, Wallsend (Northumberland) £9,644



Imports and Exports of Iron and Steel in January

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in January. Details for January, 1958, are included for the purpose of comparison.

Total Exports of Iron and Steel

Destination.	Month ended January 31.		Month ended January 31.	
	1958.	1959.	1958.	1959.
	Tons.	Tons.	£	£
Cyprus	562	72	40,871	7,713
Sierra Leone	1,615	640	103,430	59,562
Ghana	1,851	740	127,252	64,015
Nigeria	7,985	4,149	534,887	286,305
Union of South Africa	7,690	7,771	586,087	588,234
Rhodesia and Nyasaland	3,917	980	255,964	78,121
Tanganyika	865	2,166	62,156	154,942
Kenya	4,593	3,292	275,682	208,180
Uganda	211	548	12,960	39,958
Mauritius	235	152	19,898	12,164
Aden	669	218	33,159	17,503
Bahrein, Qatar, and Trucial States	733	1,609	58,463	121,100
Kuwait	2,251	1,065	164,133	77,320
India	12,115	13,853	815,934	881,677
Pakistan	14,006	4,319	802,284	199,365
Singapore	3,404	1,891	235,077	147,125
Malaya	1,120	806	82,638	51,422
Ceylon	2,470	5,178	155,088	307,785
British North Borneo	203	214	17,044	20,498
Hongkong	3,812	5,423	185,664	210,755
Australia	10,242	10,332	930,451	901,605
New Zealand	16,721	7,591	1,048,925	573,825
Canada	14,782	9,482	1,055,072	805,846
Jamaica	1,986	2,016	130,238	140,339
Trinidad	4,133	3,062	333,134	193,039
British Guiana	435	586	30,952	31,525
Other Commonwealth countries	3,139	5,346	196,333	354,467
Eire	3,888	3,650	232,566	217,988
Soviet Union	1	228	940	15,043
Finland	4,605	2,110	351,678	143,463
Sweden	10,707	11,743	689,600	682,516
Norway	7,954	8,269	469,640	476,924
Denmark	5,962	5,936	438,239	407,302
Western Germany	414	11,149	44,728	344,054
Netherlands	5,380	3,551	352,177	232,658
Belgium	3,114	2,734	198,527	174,483
France	156	210	51,359	49,508
Switzerland	1,176	542	166,222	72,901
Portugal	1,414	1,693	106,266	115,684
Spain	3,378	1,448	262,586	150,429
Italy	3,470	2,974	173,711	191,780
Austria	630	260	78,909	45,369
Yugoslavia	657	76	38,280	7,222
Greece	1,292	546	94,536	28,106
Turkey	482	279	37,014	20,562
Netherlands Antilles	150	339	17,363	35,581
Portuguese East Africa	243	127	20,904	10,662
Egypt	2,960	105	117,265	8,149
Sudan	2,618	834	149,150	61,573
Lebanon	1,305	20	88,475	2,982
Israel	526	1,090	46,393	49,740
Saudi Arabia	122	221	13,186	42,788
Iraq	4,020	7,631	276,165	497,333
Iran	3,539	2,533	272,472	161,856
Burma	1,036	686	69,858	43,573
Thailand	778	1,593	58,081	116,280
Indonesia	450	287	42,711	25,786
Philippine Republic	52	319	6,689	23,519
USA	5,023	7,766	353,245	549,520
Cuba	658	342	49,046	24,065
Colombia	732	55	59,369	4,965
Venezuela	8,565	7,298	703,725	532,215
Ecuador	344	100	33,668	9,027
Peru	1,550	229	132,062	12,702
Chile	557	73	43,869	16,864
Uruguay	308	174	19,401	16,048
Argentina	15,314	25,083	1,162,281	1,582,417
Other foreign countries	11,151	6,507	834,207	390,333
TOTAL	238,426	214,310	16,650,339	14,128,360

H. BROADBENT & SON, LIMITED, Park Street, Ashton-under-Lyne, has had plans approved for the erection of an iron foundry on a site at Cavendish Street, Ashton-under-Lyne.

Total Imports of Iron and Steel

From	Month ended January 31.		Month ended January 31.	
	1958.	1959.	1958.	1959.
	Tons.	Tons.	£	£
Rhodesia and Nyasaland	643	103	113,134	17,412
Canada	2,167	118	221,901	58,777
Other Commonwealth countries and Eire	1,907	2,145	124,974	126,209
Soviet Union	14,596	705	407,717	44,452
Sweden	2,699	1,794	352,319	248,037
Norway	6,652	5,076	501,588	333,996
Poland	—	344	—	7,591
Western Germany	6,436	1,744	504,964	210,926
Netherlands	15,460	10,047	829,493	570,100
Belgium	8,421	1,357	466,545	49,087
Luxembourg	876	94	42,936	4,339
France	5,037	439	460,268	53,554
Italy	41	54	29,152	11,439
Austria	542	376	55,667	30,709
Japan	383	—	39,490	—
USA	29,951	476	2,188,909	92,268
Other foreign countries	565	1,034	71,258	90,451
TOTAL	96,376	25,906	6,410,315	1,949,347
Iron and steel scrap and waste, fit only for the recovery of metal	23,615	215	461,220	7,888

Exports of Iron and Steel by Products

Product.	Month ended January 31.		Month ended January 31.	
	1958.	1959.	1958.	1959.
	Tons.	Tons.	£	£
Pig-iron	5,887	12,123	142,372	238,650
Ferro-columbium (niobium)	4	5	6,186	8,805
Ferro-tungsten	31	172	13,522	53,990
Other ferro-alloys	272	367	81,791	67,666
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	2,019	7,619	75,133	214,953
Pieces roughly shaped by forging*	451	23	64,672	4,520
Iron bars, rods, angles, shapes, and sections	89	64	5,253	5,170
Steel bars, rods, angles, sections, and shapes	30,321	21,036	1,999,924	1,326,731
Iron plates and sheets	—	173	04	5,888
Universal plates	290	1,337	17,760	64,931
Steel plates, 3mm. and under 4.5mm. in thickness	613	1,742	51,793	95,796
Ditto, 4.5mm. or more in thickness	13,685	10,593	824,271	520,774
Blacksheets and blackplate	31,946	18,325	2,184,200	1,378,533
Hoop and strip	5,203	6,091	436,879	496,638
Tinplate	24,115	41,470	1,941,451	3,076,078
Decorated tinplate	286	595	26,071	41,031
Galvanized sheets	5,312	6,788	411,784	504,260
Other (incl. tinned sheets, terneplate, and ternesheets)	1,348	844	125,049	78,702
Railway and tramway construction material	25,203	15,810	1,436,948	814,434
Wire rods of steel (incl. alloy steel)	3,612	3,444	167,798	139,358
Wire	9,470	8,299	762,387	709,927
Tubes, pipes, and fittings	78,269	57,320	5,874,961	4,281,525
TOTAL	238,426	214,310	16,650,339	14,128,360

* The figures for 1959 are not completely comparable with those for 1958.